

## NARRATIVE REPORT

### STILLWATER WILDLIFE MANAGEMENT AREA

MAY - AUGUST  
1952

#### PERSONNEL

|                   |           |                               |
|-------------------|-----------|-------------------------------|
| LeRoy W. Giles    | - - - - - | Refuge Manager                |
| David B. Marshall | - - - - - | Biologist                     |
| Illa E. Cress     | - - - - - | Clerk (Typing)                |
| Arthur V. Huff    | - - - - - | Super. Automotive Mechanic    |
| Manuel Olano      | - - - - - | Automotive Mechanic (General) |
| William H. Ogden  | - - - - - | Automotive Mechanic (General) |
| Earl E. Nygren    | - - - - - | Maintenance Supervisor        |

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## I GENERAL

### A. Weather Conditions

This is probably the hardest section of the narrative report to write. What can be said about the weather that hasn't been repeated many times before? If the writer had been in the marsh instead of at his desk on July 31, when a wall of water roared out of one of the Stillwater canyons during a cloudburst to wash out all roads in that area, he would be in a position to dress up this introductory section. Instead, he can only submit the usual compilation of monthly data.

| <u>Month</u>       | <u>Precip.</u> | <u>Miles of<br/>Kind</u> | <u>Max.<br/>Temp.</u> | <u>Min.<br/>Temp.</u> | <u>Mean</u> | <u>Evap.</u> |
|--------------------|----------------|--------------------------|-----------------------|-----------------------|-------------|--------------|
| May                | .05            | 2146.3                   | 87                    | 31                    | 58.5        | 6.197        |
| June               | .11            | 2117.1                   | 90                    | 27                    | 62.1        | 6.062        |
| July               | .21            | 1570.2                   | 97                    | 45                    | 73.1        | 7.540        |
| August             | .41            | 1225.2                   | 94                    | 43                    | 70.2        | 6.850        |
| Totals             | .78            | 7058.8                   | 97                    | 27                    | 65.9        | 26.649       |
| 40 Year<br>Average | 1.26           | 9060.7                   | 99.8                  | 29.2                  | 66.7        | 31.95        |

### B. Water Conditions

Water levels in the Stillwater Marsh have remained high throughout the period. Inflow through Stillwater Point Reservoir has been so great that it has nearly compensated for the loss from evaporation. Last February 19, the water level in the Swan Lake Unit, measured at the outlet structure (No. 16), was 3877.00. By August 28 this level had dropped to 3876.50, a loss of only 0.5 feet.

Since the Nutgrass Unit and the Big Water area have been maintained in a dry condition to facilitate construction work, we have not been in a position to use these natural sump areas for the disposal of surplus marsh water. It has been necessary to use Pintail Bay as a marsh outlet. Since November, 1951, we have discharged every bit of water that Structure No. 16 would carry into Pintail Bay from which it flows into the sand dune area north of the marsh and thence into the Carson Sink. This substitute marsh outlet has been adequate in preventing actual flood conditions but has not been sufficient to materially reduce the marsh water level. A big part of our trouble, of course, is sluggish water movement through the marsh itself due to the impeding action of emergent growth in the various distributary channels.

The increased volume of water inflow has created a serious maintenance problem. It has produced excessive erosion to exposed portions of new marsh dikes and has also washed out a considerable part of the rock riprap at some of the marsh structures requiring immediate replacement.

As a matter of record we will continue the tabulation, started last period, of monthly totals in acre feet of water discharged from Stillwater Point Reservoir. This represents only a little more than half of the marsh water supply but it is the only source for which accurate records are available.

|        |                 |                     |
|--------|-----------------|---------------------|
| May    | 9,571 AF        | - 113% above normal |
| June   | 8,031 AF        | - 49% above normal  |
| July   | 10,160 AF       | - 73% above normal  |
| August | <u>8,380 AF</u> | - 41% above normal  |
| Total  | 36,142 AF       | - 63% above normal  |

Spillage of surplus water from Lahontan Reservoir was stopped on May 20, but heavy irrigation demand plus lack of necessity to conserve water have maintained an unusually large drainage flow.

During the period that the Irrigation District was dumping surplus water from Lahontan Reservoir, (February 15 to May 20), the lower Carson River was utilized as the principal avenue of disposal. A steady flow of 1400 cfs. was maintained. This is the maximum capacity of the river channel. This flow created a lake in the Carson Sink estimated, from ground and aerial surveys, to be at least 140,000 acres in size.

Flooding of the Carson Sink created conditions favorable to botulism. The Pelican Island marsh, at the mouth of the river, has always been a botulism hazard, and past records indicate that serious outbreaks have occurred in this area during every period of long-water years. This year has been no exception, with botulism destroying more ducks than at any time since the start of the Stillwater Management Area.

#### C. Fires

None

## II WILDLIFE

### A. Migratory Birds

#### 1. Population and Behavior

##### Inventory Techniques

As a start to this section, it might be well to describe how our population and production figures were arrived at inasmuch as some changes in census techniques were employed.

For birds other than those actually in nesting territories, that is, the migrants and flocks of moulting drakes, the same census method as described in our last narrative report was used. This method is simply a sampling of a portion of approximately twenty habitat types designated on a habitat type map of the Stillwater Marsh. With the acreage of each habitat type known, as well as the acreage of each type covered on the census, we can project the number of birds seen to cover the entire acreage of the habitat type. For example, we have flooded nine ponds totaling 712 acres of open water which have both land edge and hardstem bulrush (Scirpus acutus) edge with open water containing patches of sago pondweed (Potamogeton pectinatus). On the census 330 acres of open water in five of these ponds is looked into. This amounts to 43% of the total acreage in this type. From this it is assumed that 43% of the ducks in this habitat type were seen.

Although this system requires an individual calculation for each species seen in each of the habitat types, we believe it is the most accurate sampling method adaptable to the marsh. Two other drawbacks to the system are the frequent changes in the habitat map made necessary by changes in plant growth and water levels as well as the need to allow for different useage in the types should water levels be different. It might be well to repeat that our habitat map is based on a cover map made from aerial photos.

This system has not been practical at the Pelican Island Marsh where the acreage of habitat is continually changing. For this area most of which is inaccessible by car, an airplane census is the most accurate, but without it the census taker has to stand on one of the highest points within this area, count what he can see and then estimate the rest on the basis of his count and the relative use of the various sections of the area found on the last airplane count. Unfortunately, we had the airplane but once during the period whereas we need it at least once per month to completely cover this and several other inaccessible areas.

Beginning on May 14 our yearly nesting pair count was initiated. Rather than trying to roughly cover the entire Area

like last year, something which would be impossible this year because of the vast amount of territory under water, we concentrated on samples of each of our habitat types. These samples were covered at two week intervals very thoroughly in an attempt to get every nesting pair within it tabulated. In most cases the samples were covered by boat or foot with only about six samples and several habitat types being covered per day. Such a system is slow but nesting pairs, rather than flying at the sound of a car to be counted like the migrants, stick to their territories and are usually well hidden in the dense vegetation of the marsh if any distance away. Nevertheless, from 9 to 70% of the edge of each habitat type was covered at two to three week intervals. Computations in the case of nesting pairs were made on the basis of miles of land edge and marsh edge, the former usually being applied to puddle ducks and the latter type of edge to divers. The checking of these samples at two to three week intervals was carried right through the brood period although towards the last the number of samples had to be reduced. In the case of broods, acreage was applied as the index rather than miles of edge. It is believed that practically all the nesting pairs on each sample area were seen. The maximum number of pairs of any one species seen on a visit was taken to be the near maximum number that used the sample with two exceptions. We started the pair count too late to pick up all the mallard pairs and accordingly allowances has to be made for this. The other exception was the cinnamon teal which nests over a more extended period than the other species. Consequently, we tabulated cinnamon pairs through both May and June.

The nesting pair count overlapped the brood counts. While tabulating gadwall, redhead and late cinnamon teal pairs in early June, we were counting Class II mallard and early cinnamon teal broods at the same time.

We don't feel our production figures for the Stillwater Marsh are nearly as accurate as the results of the pair counts. Whereas practically all the nesting pairs could be seen, we know during the trips to the sample areas many broods were under the cover of dense marsh growth where they were so often seen retreating. Strangely, in walks around the shore of ponds the writer frequently flushed broods from under desert shrubs or other dense cover on land as well. Consequently, allowances had to be made for this in the Stillwater Marsh. Sixty percent of the mallard broods of a given sample area were estimated to have been seen, 75% of the gadwall, redhead and ruddy duck broods and 50% of the cinnamon teal broods.

As for the coot, the writer is convinced after watching many a coot brood that on an average at Stillwater only half of a coot brood with one parent is in sight at a time. The other half of the brood and parent is back in the bulrush or cattails. After considerable patience on the part of the observer, the entire brood



with both parents often emerges from cover for short periods. Thus, it was estimated that practically all the coot broods were seen but usually only half of a brood at a time. With this thought in mind and the estimated percent of duck broods seen per sample, the estimated number of duck and coot broods produced by the Stillwater Marsh was adjusted accordingly.

In the Indian Lakes and at Pelican Island, where cover is thin, scarce or absent, nearly 100% of the broods in a sample area were estimated seen. Complete coot broods with both parents were apparent in these two areas.

Another factor that had to be considered was avoiding duplication in counting broods. Since cinnamon teal young may be mature at six weeks while redhead young may take nearly twice that long to mature, we used Class I broods and early Class II broods as the index to the number of broods produced. In the case of coverage at two-week intervals, the number of Class I broods turned up each time was taken as an index to the total number produced. This avoided duplication inasmuch as a young one is in this stage for about two weeks and was a Class II when the next count came around. It requires discretion in differentiating between Class I and II young. It was also thought that early Class II teal young are probably not over two weeks old. Where coverage was at three-week intervals early Class II young were used in computing the number of broods produced.

Knowing this, along with the number of nesting pairs, we obtained some interesting figures on the proportion of the pairs that successfully raised young.

Despite the vast amount of time spent on brood counting, only in case of the redhead were enough broods sampled to give a reliable production figure. Therefore, the average brood sizes given in Dr. Griffith's summary of waterfowl brood count data were used. The low number of broods seen can be attributed to the small amount of territory that could be covered afoot and by boat per day and the long distances and consequent time required to reach the various sample areas.

The time spent obtaining waterfowl data afforded the opportunity to determine nesting populations of other waterbirds and shorebirds as well. To obtain figures on these birds, methods similar to those used on waterfowl were employed.

Goose broods were so few and scattered that every brood that was seen, in or out of a sample area, was considered when it came to making a final production estimate.

### Spring Migration

By the first of May the spring migration was practically complete. A few small scattered flocks of pintails, green-winged teal and shovellers were all that remained of the spring waterfowl migration. A few dowitchers and peeps were the only shorebirds still holding on. By the middle of May these birds were gone, leaving us with our small nesting population.

### Nesting Season

With water levels even higher than the high of last year in the Stillwater Marsh, and the Pelican Island Marsh completely flooded for the first nesting season in years, we experienced a nesting season that was just as abnormal as all the water. Habitat conditions were entirely different than previous years and consequently so were the relative numbers of nesting species.

In general the breeding duck population was even higher than the 1951 peak, which represented a two-fold increase in nesting pairs over 1950. Like 1951, this increase can, in part, be attributed to high water conditions which resulted in the inundation of additional habitat. However, waterfowl pairs this year were even more scattered than previously with fewer pairs occurring per mile. The habitat was poorer in quality, particularly for redheads. Nesting success was lower so that despite the increase in pairs of ducks, there was a slight decrease in the number of young produced.

Let us examine this a little more closely so as to see what really happened. Looking at the Stillwater Marsh first, water levels in this area were roughly up to ten inches higher during the nesting season of 1951 over 1950. This brought about changes in the form of spilling water over humps into some of the low depressions surrounding the marsh. These intermittently flooded low depressions are especially attractive to ducks and accounted for a 118% increase in Stillwater Marsh nesting duck pairs in 1951 over 1950. For the 1952 nesting season water levels were even higher. It is difficult to say how much higher because this varied over a wide margin in different parts of the marsh. It can be said, however, that water levels in many ponds were 20 inches higher this year than the more normal 1950 season. This not only flooded larger areas surrounding the marsh, but created two other major changes as well. Of 200 miles of shoreline normally in the Stillwater Marsh, excluding the newly flooded sand dune area north of Pintail Bay, 117 miles is closed in with cattail. That is, cattail in water joins up against the saltgrass on land, thereby making this 117 miles of shoreline useless to nesting pairs of waterfowl. This year's high water kept this saltgrass zone against the cattail flooded during the nesting season, thereby permitting all the land edge or shoreline of the Stillwater Marsh, excepting the Nutgrass Unit, to be used as waterfowl



Table I. Numbers of nesting pairs for the Stillwater Wildlife Management Area over the last three years with percent change in 1952 as compared to 1951

| <u>Species</u>    | <u>1950</u> | <u>1951</u> | <u>1952</u> | <u>% Change<br/>'52 Over '51</u> |
|-------------------|-------------|-------------|-------------|----------------------------------|
| Canada Goose      | 15          | 32          | 30          | - 6%                             |
| Mallard           | 100         | 172         | 554         | + 222%                           |
| Gadwall           | 200         | 251         | 449         | + 79%                            |
| Baldpate          | 10          | 15          | 25          | + 67%                            |
| Pintail           | 20          | 33          | 75          | + 127%                           |
| Green-winged Teal | 0           | 3           | 12          | + 300%                           |
| Blue-winged Teal  | 0           | 0           | 7           | + 700%                           |
| Cinnamon Teal     | 340         | 762         | 1149        | + 51%                            |
| Shoveller         | 15          | 53          | 18          | - 66%                            |
| Redhead           | 650         | 1427        | 1214        | - 15%                            |
| Ruddy Duck        | <u>20</u>   | <u>60</u>   | <u>145</u>  | <u>+ 143%</u>                    |
| Total Ducks       | 1355        | 2776        | 3648        | + 31%                            |
| Coot              | <u>1500</u> | <u>1668</u> | <u>2174</u> | <u>+ 30%</u>                     |
| Total Waterfowl   | 2870        | 4476        | 5852        | + 31%                            |

territorial habitat. This, and the flooding of the low depressions around the marsh, created almost three times as much shoreline as normal. With the gain of this shoreline, Stillwater had an estimated 10% increase in nesting duck pairs over 1951 despite the loss of the Nutgrass Unit which supported 30% of last year's pairs.

Table II shows that 47% of the pairs established themselves in territories that were dry last year. These figures seem interesting when one considers that a smaller number of acres of habitat was under water this year than last because of the practically dry state of the 3,132 acre Nutgrass Unit. Also, approximately 45% of the pairs selected territories in the saltgrass zone even though it represented but 2 or 3% of the habitat acreage in the Stillwater Marsh.

Table II. Numbers and percentage of principal waterfowl nesting pairs of Stillwater Marsh that established themselves in territorial habitat that was dry last year.

| <u>Species</u> | <u>Number</u> | <u>Percent</u> |
|----------------|---------------|----------------|
| Mallard        | 234           | 55%            |
| Gadwall        | 169           | 58             |
| Pintail        | 11            | 46             |
| Cinnamon Teal  | 533           | 55             |
| Redhead        | 381           | 35             |
| Ruddy Duck     | <u>39</u>     | <u>36</u>      |
| Total Ducks    | 1367          | 47             |
| Coot           | 644           | 31             |

With the gain in shoreline by the high water came a deterioration in the quality of the more permanent marsh ponds. Sage pondweed failed to come up as usual and presumably the deep turbid water of these ponds made what food there was on the bottom less accessible than when the water was shallow.

The gain in land edge and loss in quality of the more permanent ponds and the dry state of the Nutgrass Unit brought forth a radical change in the relative abundance of the various species using the marsh. This is shown in Table III. Where the marsh had a 14% increase in puddle ducks, it had an 18% decrease in divers. The flooded saltgrass edges and consequent increase in shoreline created habitat most suitable for puddle ducks whereas, the more permanent ponds which suffered the decline in quality are primarily redhead areas as is the Nutgrass Unit.

Table III. Relative abundance of various species of nesting pairs in the Stillwater Marsh portion of the Area only. This illustrates how 1950 and 1951 ran practically identical, but with the 62% increase in land edge and decrease in quality of redhead habitat in 1952, the composition of the nesting ducks showed considerable change.

| <u>Species</u> | <u>1950</u> | <u>1951</u> | <u>1952</u> |
|----------------|-------------|-------------|-------------|
| Mallard        | 6%          | 6%          | 15%         |
| Cadwall        | 10          | 7           | 10          |
| Pintail        | 1           | 1           | 1           |
| Cinnamon Teal  | 26          | 28          | 33          |
| Shoveller      | 1           | 2           | 0           |
| Redhead        | 53          | 54          | 38          |
| Ruddy Duck     | 3           | 2           | 3           |

Table IV. Relative abundance of nesting pairs of ducks and Class I broods in seven of the habitat types of the Stillwater Marsh. This represents both high and low densities.

| <u>Type</u>                                  | <u>Miles of Edge</u> |              |              |                        | <u>Acres</u> |                        |                         |
|--|----------------------|--------------|--------------|------------------------|--------------|------------------------|-------------------------|
|  | <u>Land</u>          | <u>Marsh</u> | <u>Total</u> | <u>Pairs<br/>p/mi.</u> | <u>No.</u>   | <u>Pairs<br/>100 A</u> | <u>Broods<br/>100 A</u> |
| Saltgrass adjacent<br>to Cattail             | 131                  | 131          | 262          | 4                      | 200          | 571                    | 188                     |
| Flooded Alkaliweed                           | 2.5                  | 0            | 2.5          | 18                     | 400          | 59                     | 50                      |
| Flooded Saltgrass                            | 3.6                  | 0            | 3.6          | 19                     | 92           | 73                     | 51                      |
| Ponds, Hardstem<br>Bulrush & Land Edge       | 17                   | 36           | 53           | 6                      | 712          | 47                     | 27                      |
| Ponds, All Cattail,<br>No Pondweed           | 0                    | 34           | 34           | 2                      | 903          | 8                      | 1                       |
| Goose and Foxtail Lake<br>and Reservoir Type | 9                    | 27           | 36           | 2                      | 2918         | 3                      | 3                       |
| Ponds, Cattail and<br>Land Edge              | 13                   | 23           | 36           | 9                      | 544          | 49                     | 40                      |

Each of the habitat types designated for the marsh almost consistently carried fewer pairs per mile of edge or per 100 acres than last year. Last year the Stillwater Marsh averaged 10 pairs of ducks per mile of marsh and land edge while this year it averaged 6 pairs. Expressed in terms of acres, there were 45 pairs per 100 acres of nesting pair habitat in 1951 while this year it dropped to 34 pairs. This gave the impression there were fewer ducks, which there was to a given pond, but the extra miles of shoreline made up the difference. As a whole, it seemed like the habitat was capable of supporting more pairs than it really did.

Of special note this year were a few puddle duck pairs which established territories considerable distances from land along the edge of ponds surrounded by cattails. These birds, mallards, gadwall and cinnamon teal, used muskrat feeding platforms and houses for loafing bars. Where they nested remained a mystery until two mallard nests were found in hollows on the sides of muskrat houses. Last year and the year before we noted a few such pairs along the edges of ponds normally thought to be redhead habitat only, but were inclined to ignore them as nesting pairs, thinking no sensible puddle duck would nest in such habitat. This year, when 44 pairs of puddle ducks against only 28 diving duck pairs were tabulated for the very unproductive Lead, Willow, Swan and Long Lakes and Millen Channel habitat, the fact that puddle ducks nested in such ponds could no longer be ignored, especially in view of the two nests actually found in the sides of muskrat houses. The habitat spoken of above consists of 903 acres of open water surrounded completely by heavy cattail and hardstem bulrush growth and contains 34 miles of edge. The open water this year ran around five feet in depth and contained no aquatic growth save a little coontail (Ceratophyllum demersum) and bladderwort (Utricularia vulgaris). This hardly seems like cinnamon teal habitat even to the rate of one pair per mile.

The flooded sand dune area below Pintail Bay supported practically no pairs, and consequently was not included as a part of the habitat. Plant growth is just beginning to appear in this newly flooded area.

Even though there were 10% more pairs at Stillwater in 1952 than in 1951, the overall increase in numbers of nesting pairs for the entire Stillwater Wildlife Management Area amounted to 31%. Of course, this was because of plenty of water at Pelican Island for the first nesting season in years. Normally this marsh does not attract nesting pairs because of its dry to semi-dry state. This year habitat conditions there were ideal, particularly for puddle ducks. Pelican Island averaged more puddle ducks per mile of land edge than Stillwater. Some Pelican Island shorelines ran 30 pairs of puddle ducks per mile or 1-1/2 times as many as the best Stillwater habitat. However, this area did not come up to Stillwater on an acreage basis because it lacked a proportionate amount of edge compared to its acreage. Consequently there were only 22 pairs per

100 acres of habitat at Pelican Island compared to the 34 at Stillwater. With little real marsh edge (estimated at five miles) Pelican Island was almost exclusively puddle duck habitat. Such species as pintails, greenand blue-winged teal and baldpate, which do not like nesting at Stillwater at all, appeared in significant numbers at Pelican Island.

Table V. Distribution of waterfowl nesting pairs in the four sections of the Stillwater Wildlife Management Area

| <u>Species</u>    | <u>Total Pairs</u> | <u>Stillwater Marsh</u> |             | <u>Pelican Island</u> | <u>Indian Lakes</u> |
|-------------------|--------------------|-------------------------|-------------|-----------------------|---------------------|
|                   |                    | <u>Refuge</u>           | <u>Oosa</u> |                       |                     |
| Canada Goose      | 30                 | 17%                     | 67%         | 16%                   | 0%                  |
| Mallard           | 554                | 4                       | 73          | 13                    | 10                  |
| Gadwall           | 449                | 2                       | 63          | 15                    | 20                  |
| Baldpate          | 25                 |                         |             | 16                    | 84                  |
| Pintail           | 75                 |                         | 32          | 67                    | 1                   |
| Green-winged Teal | 12                 |                         |             | 67                    | 33                  |
| Blue-winged Teal  | 7                  |                         |             | 57                    | 43                  |
| Cinnamon Teal     | 1149               | 2                       | 82          | 13                    | 3                   |
| Shoveller         | 18                 |                         | 17          | 83                    |                     |
| Redhead           | 1214               | 2                       | 88          | 8                     | 2                   |
| Ruddy Duck        | <u>145</u>         | <u>1</u>                | <u>71</u>   | <u>24</u>             | <u>2</u>            |
| Total Ducks       | 3648               | 2                       | 78          | 14                    | 6                   |
| Coot              | <u>2174</u>        | <u>1</u>                | <u>92</u>   | <u>3</u>              | <u>1</u>            |
| Total Waterfowl   | 5852               | 3                       | 83          | 10                    | 4                   |

In our third nesting area, the Indian Lakes, there was little change in conditions. A substantial portion of the Indian Lakes shorelines were sampled for the first time this year. A good portion of these shorelines are ditches and channels. They turned up more pairs than expected. Previous estimates for this area have probably been too low. As shown in Table V, this area brought forth 6% of the duck pairs.

In our last narrative, the Canada goose nesting season was covered.

As for coots, there is little to report that is not covered in the tables. Coots are something we keep getting more of, mostly in the Stillwater Marsh. There is hardly a piece of marsh they do not occupy in force. Could they be a factor in holding down duck nesting pair densities here so low?

Table VII. Nesting population of waterbirds other than waterfowl 1951 compared to 1952

| Species                   | Stillwater Marsh |      | Indian Lakes |      | Pelican Island |      | Batture SWA |       |
|---------------------------|------------------|------|--------------|------|----------------|------|-------------|-------|
|                           | 1951             | 1952 | 1951         | 1952 | 1951           | 1952 | 1951        | 1952  |
| Bared Grebe               | 4                | 4    | 6            | 12   |                | 8    | 10          | 24    |
| Western Grebe             | 287              | 258  | 8            | 15   |                | 10   | 295         | 278   |
| Pied-billed Grebe         | 440              | 200  | 6            |      |                |      | 446         | 200   |
| Great Blue Heron          | 200              | 1500 |              |      |                |      | 200         | 1500  |
| American Egret            | 10               | 10   |              |      |                |      | 10          | 10    |
| Snowy Egret               | 400              | 1400 |              |      |                |      | 400         | 1400  |
| Black-crowned Night Heron | 320              | 1100 |              |      |                |      | 320         | 1100  |
| American Bittern          | 90               | 50   |              |      |                |      | 90          | 50    |
| White-faced Glossy Ibis   | 200              | 300  |              |      |                |      | 200         | 300   |
| Virginia Rail             | 60               | 40   |              |      |                |      | 60          | 40    |
| Sora                      | 300              | 200  |              |      |                |      | 300         | 200   |
| Snowy Plover              | 50               | 20   |              |      |                | 6    | 50          | 26    |
| Killdeer                  | 118              | 180  | 40           | 272  | 50             | 125  | 208         | 577   |
| Long-billed Curlew        | 2                | 2    |              |      |                | 2    | 2           | 4     |
| Avocet                    | 1360             | 460  | 116          | 105  | 500            | 4200 | 1976        | 4765  |
| Black-necked Stilt        | 573              | 215  | 12           | 20   | 310            | 100  | 895         | 335   |
| Wilson's Phalarope        | 26               | 16   | 4            | 32   | 25             | 50   | 55          | 98    |
| California Gull           | 200              | 250  |              |      |                |      | 200         | 250   |
| Forester's Tern           | 125              | 120  |              |      |                | 50   | 125         | 170   |
| Caspian Tern              | 100              | 80   |              |      |                |      | 100         | 80    |
| Black Tern                |                  |      |              |      |                | 170  |             | 170   |
| Total                     | 4865             | 6405 | 192          | 451  | 885            | 4721 | 5942        | 11577 |



In summation, our nesting pair count, combined with cover maps, a map measurer and a calculating machine, showed the Stillwater Marsh to contain this year 84% of the nesting habitat (land and marsh edge) of the entire Management Area. It carried 80% of the nesting pairs of ducks, 84% of the geese and 96% of the coots. Pelican Island provided 6% of the habitat and supported 14% of the ducks, 16% of the Canada geese and 3% of the coot pairs. The Indian Lakes, with 10% of the edge, carried 6% of the ducks and 1% of the coots.

Table VI. Percentage of nesting pairs successful in the three marsh and water areas of the Stillwater Wildlife Management Area as well as for the entire Area. This is based on nesting pair count followed by brood count.

| <u>Species</u>  | <u>Stillwater<br/>Marsh</u> | <u>Pelican<br/>Island</u> | <u>Indian<br/>Lakes</u> | <u>Entire SWMA</u> |
|-----------------|-----------------------------|---------------------------|-------------------------|--------------------|
| Canada Goose    | 72%                         | 40%                       | 0%                      | 67%                |
| Mallard         | 76                          | 37                        | 69                      | 70                 |
| Gadwall         | 87                          | 90                        | 62                      | 82                 |
| Cinnamon Teal   | 59                          | 30                        | 22                      | 55                 |
| Redhead         | 49                          | 11                        | 42                      | 46                 |
| All Ducks*      | 59                          | 36                        | 54                      | 56                 |
| Coot            | <u>26</u>                   | <u>66</u>                 | <u>27</u>               | <u>27</u>          |
| Total Waterfowl | 46                          | 40                        | 52                      | 45                 |

\* Principal nesting species only listed. All Ducks covers figures for those nesting in insignificant numbers.

Table VI shows the nesting success found on the three areas as based upon the proportion of pairs to broods found later. Except in the case of the gadwall, Pelican Island success ran consistently low compared to the other two areas. Many nests were found abandoned, for no apparent reason, at Pelican Island. Some of the hens were probably lost to botulism. Nesting cover here was not as good as at Stillwater and in the Indian Lakes.

As a whole, the table shows good duck nesting success when compared to other areas of the West. Presumably this is because no predation problem seems apparent nor have we had trouble with water levels rising and flooding out nests. Coots, however, did not show up well. Are some of our coots counted as nesters really loafers?

Another interesting point that can be taken from the nesting pair success table is the consistently high success of mallards and gadwalls compared to our more numerous cinnamon teal and redheads.

Marsh and shorebird nesting population data is covered in Table VII. As shown, the nesting population of these birds has doubled in the last year. Water at Pelican Island accounts for much of this increase. Note how the avocet population shifted from Stillwater to Pelican Island between 1951 and 1952. Stillwater didn't seem to be supporting its full capacity of avocets and stilts.

We cannot explain the increase in members of the heron and egret family unless the fire in the Canvasback Gun Club in late April drove some of these birds out from Canvasback Club rookeries to ours. We had three big heron rookeries, all in hard-stem bulrush in the Stillwater Marsh. The largest, containing over 1000 nests, was located in the Willow Lake Unit southwest of the Northwest Pond. It was devoted primarily to great blue herons although black-crowned night herons, snowy egrets and white-faced glossy ibis used it as well. The second largest rookery, located about one-fourth mile west of Structure 16, was used by all four species with egrets and night herons predominating. Number three rookery was practically dry, being in the Nutgrass Unit one-half mile north of Keller Pond. It was used by ibis and egrets.

#### Brood and Moulting Season

There is little to say about production that isn't covered in the tables. Broods were generally scattered over the entire Stillwater and Pelican Island Marsh areas. Last year, at Stillwater, the Big Water, dry this year, provided the rearing habitat for most of Stillwater's ducks from Class II stage on. This year, with the Big Water dry, there were no brood concentrations of any size. Table IV shows how in general the relative abundance of broods in the various habitat types ran about the same as for nesting pairs. The tables show a greater portion of the production attributable to the refuge than the number of nesting pairs would indicate. Some broods apparently moved to the refuge from the public hunting area. The alkali flat flooded to the east of Foxtail Lake on the refuge was a particularly good brood area although it did not support any nesting pairs.

A few broods also turned up in some of the deeper ponds of the Nutgrass Unit, which were shallowly flooded for a short period from late May to mid-June. During the short period these ponds were flooded, they served as a moulting area for unsuccessful drakes and those which completed their family duties. On June 16 about 700 mallard, gadwall, cinnamon teal and redhead drakes were using the Nutgrass Unit soon after which the ponds went dry. Other moulting areas at Stillwater included the sand dune area north of Pintail Bay and Pintail Bay itself. In all, however, these areas provided moulting

Table VIII. 1952 Waterfowl production on the SWMA as compared to 1951

| <u>Species</u>    | <u>1951</u>  | <u>1952</u>         | <u>% Change</u> |
|-------------------|--------------|---------------------|-----------------|
| Canada Goose      | 90           | 75                  | - 17%           |
| Mallard           | 841          | 2543                | + 302           |
| Gadwall           | 1332         | 2608                | + 96            |
| Baldpate          | 79           | 108                 | + 37            |
| Pintail           | 152          | 220                 | + 45            |
| Green-winged Teal | ?            | 18                  | + ?             |
| Blue-winged Teal  | 0            | ?                   | ?               |
| Cinnamon Teal     | 3745         | 4113                | + 10            |
| Shoveller         | 253          | 45                  | - 82            |
| Redhead           | 6751         | 3388                | - 54            |
| Ruddy Duck        | <u>240</u>   | <u>171</u>          | <u>- 28</u>     |
| Total Ducks       | 13,393       | 13,214              | - 1             |
| Coot              | <u>2,420</u> | <u>2,306</u>        | <u>- 5</u>      |
| Total Waterfowl   | 15,903       | 15,596 <sup>5</sup> | - 2             |

Table IX. Production distribution in the four sections of the SWMA

| <u>Species</u>    | <u>Total</u> | <u>Stillwater<br/>Refuge</u> | <u>Marsh<br/>Open</u> | <u>Pelican<br/>Island</u> | <u>Indian<br/>Lakes</u> |
|-------------------|--------------|------------------------------|-----------------------|---------------------------|-------------------------|
| Canada Goose      | 75           | 21%                          | 68%                   | 11%                       | 0%                      |
| Mallard           | 2543         | 5                            | 78                    | 7                         | 10                      |
| Gadwall           | 2608         | 8                            | 61                    | 16                        | 15                      |
| Baldpate          | 108          |                              |                       | 18                        | 82                      |
| Pintail           | 220          |                              | 50                    | 50                        |                         |
| Green-winged Teal | 18           |                              |                       | 67                        | 33                      |
| Blue-winged Teal  | ?            |                              |                       |                           |                         |
| Cinnamon Teal     | 4113         | 5                            | 87                    | 7                         | 1                       |
| Shoveller         | 45           |                              | 29                    | 71                        |                         |
| Redhead           | 3388         | 7                            | 89                    | 2                         | 2                       |
| Ruddy Duck        | <u>171</u>   | <u>4</u>                     | <u>43</u>             | <u>44</u>                 | <u>9</u>                |
| Total Ducks       | 13,214       | 6                            | 78                    | 9                         | 7                       |
| Coot              | <u>2,306</u> | <u>3</u>                     | <u>89</u>             | <u>7</u>                  | <u>1</u>                |
| Total Waterfowl   | 15,596       | 6                            | 80                    | 8                         | 6                       |

sanctuaries for fewer than 2000 ducks, most of which were redheads. The Stillwater Point Reservoir provided haven for about 100 moulting Canada geese.

The real moulting area was Pelican Island where additional drakes kept piling in throughout the period. By the end of July over 4000 drakes were using this area for moulting purposes.

Moulting birds did not use the Indian Lakes in significant numbers. However, the 52 acre seep pond there once again served as the brood pond for this area. Gadwalls and other pairs which set up territories along the ditches and lakes of this area moved their broods to this seep lake, which is full of sago pondweed, wigeongrass (*Ruppia maritima*) and aquatic animal life. In late August this lake provided host to many young redheads as well. These redheads didn't appear until Class III stage and apparently came overland from Stillwater.

### Fall Migration

Fall migrant ducks suddenly jumped in on us in substantial numbers the first week of August, a week to two weeks early. The first birds were primarily pintails which hit Pelican Island, ignoring Stillwater. By August 20 some of the migrants began hitting Stillwater. This information is illustrated in Table X which shows how Pelican Island was used little during the nesting season, but as moulting drakes and finally migrants pulled into this area, its use steadily rose.

Table X. Relative duck use of various sections of the Area expressed in percentages of total number on the Area. As usual, the Refuge was used little.

| <u>Date</u> | <u>Total</u> | <u>Stillwater Marsh</u> |             | <u>Pelican Island</u> | <u>Indian Lakes</u> |
|-------------|--------------|-------------------------|-------------|-----------------------|---------------------|
|             |              | <u>Refuge</u>           | <u>Open</u> |                       |                     |
| May 1       | 8,310        | 2%                      | 62%         | 33%                   | 3%                  |
| May 15      | 8,403        | 1                       | 74          | 19                    | 6                   |
| May 29      | 9,677        | 1                       | 64          | 30                    | 5                   |
| June 16     | 11,503       | 2                       | 58          | 36                    | 4                   |
| June 30     | 10,130       | 2                       | 48          | 47                    | 3                   |
| July 14     | 10,600       | 3                       | 35          | 59                    | 3                   |
| July 28     | 12,000       | 2                       | 52          | 43                    | 3                   |
| August 6    | 23,970       | 1                       | 9           | 88                    | 1                   |
| August 20   | 23,200       | 8                       | 23          | 65                    | 4                   |

Actually, the Stillwater Wildlife Management Area saw only a fraction of the ducks using the Fallon area. Rather than choosing marsh areas to sit down in, most of the migrants seemed to feel more at

40 Thousand

# DUCK POPULATION TRENDS

1952  
1951  
1950

25

20

15

10

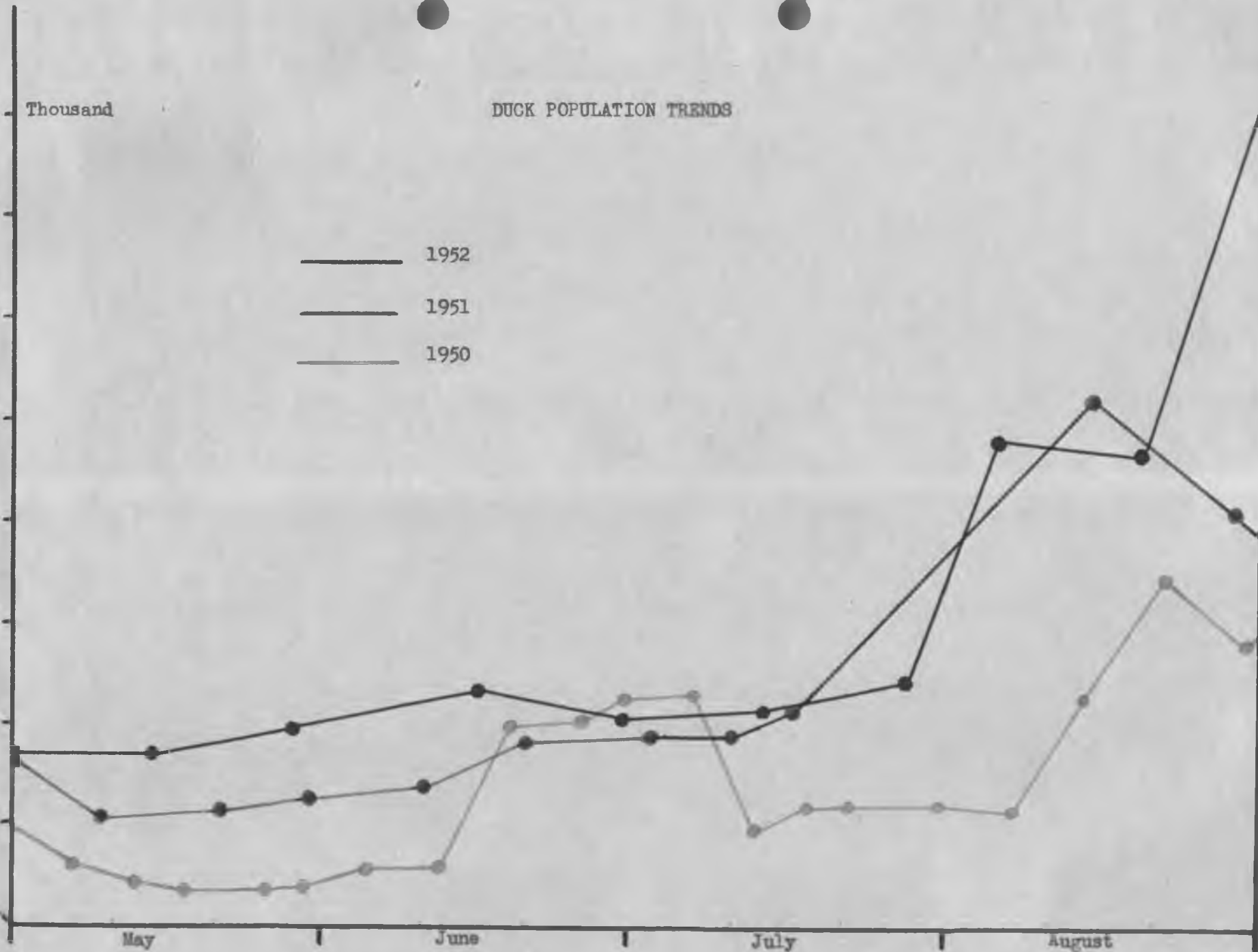
5

May

June

July

August



home on farmland which they hit unusually early and in unusually heavy numbers. Then rather than continuing their migration as normal, they found feeding conditions so good in newly planted alfalfa and clover that nothing has been seen of the usual population drop from mid-August on. There has been a steady build up through August instead, as shown on the population graph. Crop depredation on the Newlands Project, as a result, has suddenly become a real problem this year. Some farmers are laying the blame on the Refuge, which they say has attracted such an unusually large concentration of birds.

Besides ducks, we had an influx of coots, which was even larger than last year's. This is discussed under coot in the section below.

The fall migration of shorebirds has not been as spectacular as usual. The loss of the Big Water serves as an explanation of this. Pelican Island was the only place where shorebirds were seen in substantial numbers.

#### Additional Information on Specific Species and Groups

Canada Goose. After a steady increase over 1949, goose production took a slight drop this year. We have no explanation for this. Besides nesting geese, we had up to 100 non-breeders which hung around the refuge during May and June. During July and August additional honkers moved in, splitting their use between Pelican Island and Stillwater about equally. Their numbers seldom got over 500, a disappointingly low figure compared to a population of 2800 on August 14, 1950, and 1800 on August 15, 1951. At Stillwater these birds fed on green shoots in stands of new seedling cattail at Dry Lake, Pintail Bay and "D" Dike.

Mallard. Other than the heavy nesting population, mallard numbers ran about normal with a gradual build-up through the period at the main moulting area at Pelican Island. Ten mallard nests were found. Two were in the sides of muskrat houses at Stillwater. One was in Juncus under a rabbitbush at the Indian Lakes. Seven were at Pelican Island, five of which were in Juncus. Strangely, one was in driftwood with no cover whatsoever. The clutch in this nest was beginning to hatch. The other was under a burro-weed (Allenrolfea occidentalis) bush.

Gadwall. Numbers of this species ran a little heavier than normal all through the period. Six gadwall nests were located in Juncus at Pelican Island, one under a sea-blite (Suaeda torreyana) shrub at Pelican Island, one under a greasewood in the Indian Lakes and two in saltgrass at Stillwater.

Baldpate. Baldpate nesting has continued to grow, but is restricted to the Indian Lakes and Pelican Island. Migrants failed



to show up in appreciable numbers this period.

Pintail. Nesting of this species was most conspicuous at Pelican Island. Drakes, additional to those which nested on the area, began showing up at Pelican Island by mid-June. The real influx showed up the first of August. From July 14 to August 6 census figures show pintail numbers jumped from 1500 to almost 16,000.

Green-winged Teal. The first proof of this species nesting on the Management Area came when a hen was flushed from a nest with four eggs under a greasewood at the edge of one of the seep lakes on May 16. A few scattered pairs located themselves in both the Indian Lakes and at Pelican Island during the nesting season. Migrant green-winged teal showed up in appreciable numbers with the pintails in August.

Blue-winged Teal. At least six drakes were seen during the nesting season at Pelican Island and in the Indian Lakes. Because of the impossibility of distinguishing between hens of this species and the cinnamon teal, a positive nesting record will be difficult to establish. Presumably this species is nesting. Ten blue-winged males were seen in 1949 and 1950 but only one in 1951.

Cinnamon Teal. This species nearly topped the redhead in nesting numbers for first place on the Area this year. As normal, it reached a peak during the nesting season rather than afterwards. During August our cinnamons gradually disappear. Twelve cinnamon teal nests were found, all at Pelican Island. Most of these were in Juncus on the side of the East-West Dike.

Shoveller. For some unknown reason, the small nesting population of this species took a sudden drop this year after a good rise last year. Like last year, migrant shovellers first appeared in substantial numbers the last of August.

Redhead. As previously mentioned, our nesting redheads didn't fare so well this year so far as numbers go. Production per pair seemed lower than last year as well. As in previous years, the Management Area served as a moulting haven for drake redheads additional to those which nested on the Area. These birds congregated on Pintail Bay and north of Pelican Island itself. By the first week of August they disappeared along with a good part of the hatch. This is the usual procedure.

Canvasback. One to two straggler cans were seen on Foxtail Lake and Pintail Bay on May 22 and 23.

Scaup. Ten were seen on Duck Lake at Pelican Island on May 2.

Bufflehead. Two were seen in the Stillwater Marsh on May 1.

Ruddy Duck. Despite the almost dry state of the Nutgrass Unit, their favorite nesting area, ruddies made a good showing this year in the form of nesting pairs; but few broods showed up. A number of extra ruddies showed up at Pelican Island on June 30, but like last year no late summer influx occurred.

American Merganser. Two flightless individuals were noted at the north end of Pintail Bay on June 17.

Coot. Here is the only place we can talk about real numbers. Once again, we had another jump in both breeding and post-breeding numbers. On the basis of coot use days, this is the way it figures for the period for this year and the previous two:

|      |  |
|------|--|
| 1950 | 549,000 coot days May through August   |
| 1951 | 855,000 coot days May through August   |
| 1952 | 1,044,000 coot days May through August |

Actually, coot use days in 1952 were even greater than shown above. From August 20 to the date of the next census, September 4, the coot population increased from 29,000 to 45,400, but the later figure couldn't be used in the computation until September 4. Coot production here is very difficult to determine because of the heavy use made by the birds of cover. After prolonged watching of coots working in and out of the cattails and bulrush of the Stillwater Marsh, it is felt on the nesting pair count in most portions of the marsh one coot seen represented a pair, as nearly always there was another coot under cover. It was already mentioned that the broods we see are usually only half broods. Last year they were considered full broods. Consequently, last year's coot production figure was revised in Table VIII. Most of the coot useage takes place in the Stillwater Marsh.

Grebes. As in the past, eared grebes built floating nests of sago pondweed in the 52-acre seep pond of the Indian Lakes. Western and pied-billed grebes frequented almost every pond of the Stillwater Marsh. A few Western grebes also nested at Pelican Island and, strangely, were incubating through August.

Pelicans and Cormorants. White pelican numbers for the Area were above normal for the period. While there was only 200 present the latter part of August of 1951, there was ten times that many present at the same time this year. Inundation of Pelican Island must have created ideal fishing conditions, as large flocks worked this area over as well as the sand dune area north of Pintail Bay. Cormorants were less numerous, the largest number seen at one time being three. These birds nest at the Anaho Island Refuge in Pyramid Lake.

Hérons, Egrets and Ibis. The nesting of these birds has been previously covered. After the nesting season, herons and egrets become particularly conspicuous. The egrets, both American and snowy, are often seen feeding with a mob of pelicans. American bitterns were occasionally seen in the saltgrass zone. A least bittern was seen three times in the Lead Lake and Millen's Charnel area in June, July and August. Previously we had only one record for this bird.

Rails. Not a single sora was seen this period, but many were heard. Two Virginia rails were seen. These birds are probably pretty numerous, but because of their secretiveness and the dense cover they inhabit, we have no way of telling in what numbers they occur.

Shorebirds. With the Big Water dry, we didn't have conspicuous numbers of shorebirds in any one place. Instead, both nesting and migrant concentrations, occurred at Pelican Island, at the south end of the Stillwater Point Reservoir and along the south shore of the newly flooded Carson Sink. There was no conspicuous number of avocets and stilts along the dikes like last year. The large amount of water spread the shorebirds out. Snowy plovers were seen in the sand dune area north of Pintail Bay and at Pelican Island, where they undoubtedly nested. Wilson Phalaropes were most common at Pelican Island both during and after the nesting season. Only one black-bellied plover was seen, a male picked up sick from botulism at Pelican Island on August 27. Species which pass through in August included willets, greater yellow-legs, least sandpipers, dowitchers, western sandpipers and marbled godwits.

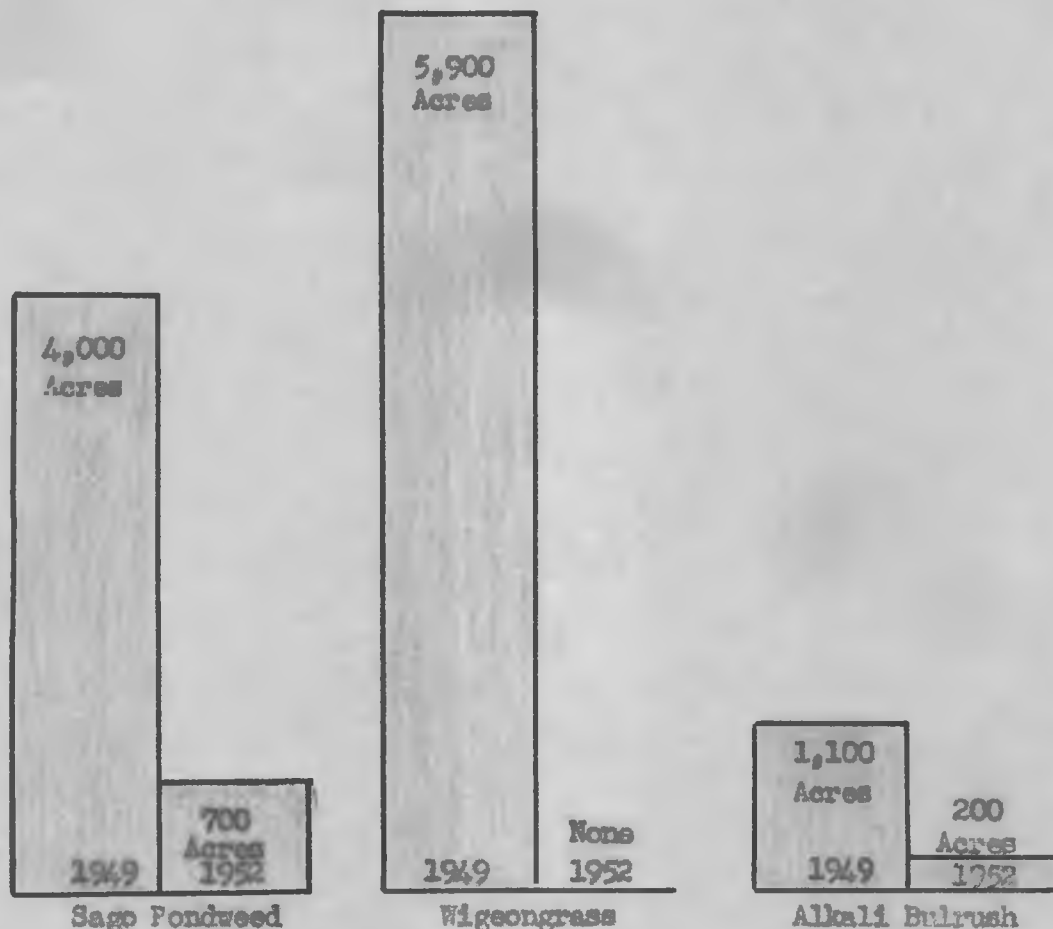
Gulls and Terns. Caspian terns and California gulls again nested on the little island in the Stillwater Point Reservoir. Forester's terns, which nested in one big colony in alkali bulrush in the Nutgrass Unit last year, spread out this year in a number of small colonies. Location of these colonies included Tule Lake, Pintail Bay, southwest end of the Northwest Pond and Pelican Island. Black terns were numerous at Pelican Island during the nesting season, where, presumably, they nested. Black terns weren't seen last year until late summer.

## 2. Food and Cover

Since food and cover conditions differed so widely between the Stillwater Marsh, Pelican Island and the Indian Lakes, it appears best to cover these areas individually.

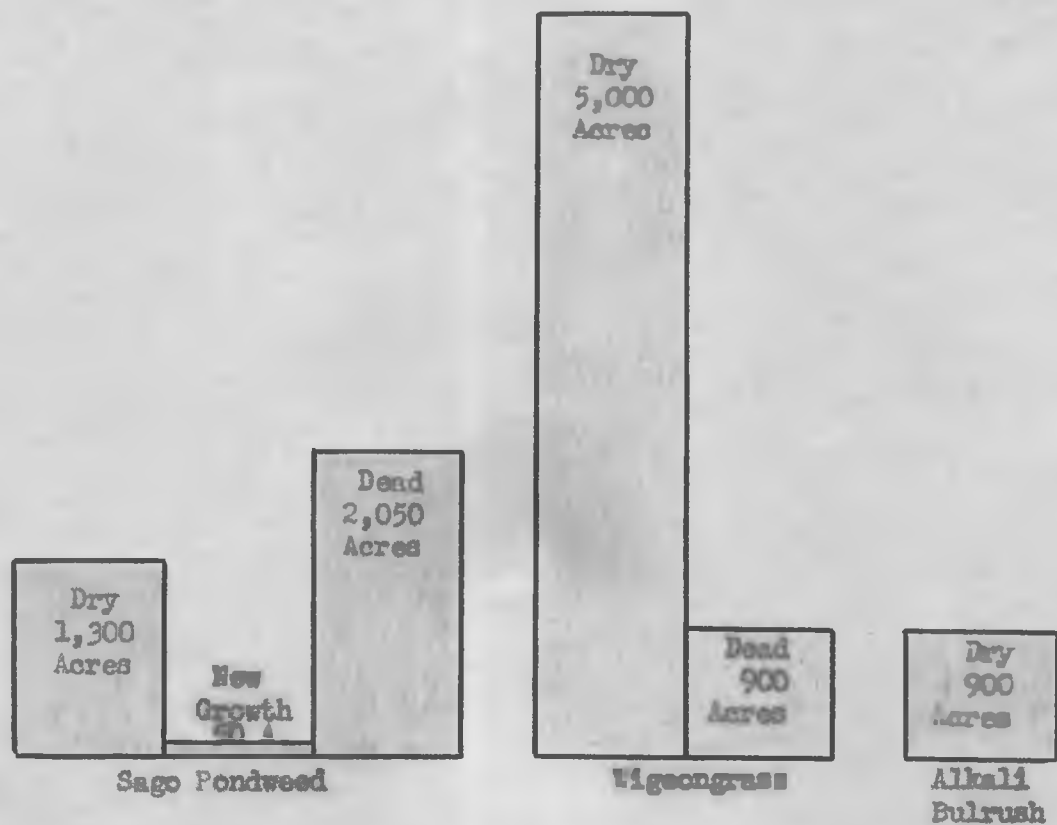
### Stillwater Marsh

Food conditions at Stillwater are at their lowest ebb in years. The accompanying histograms show the status of three of the marshes main food plants, sago pondweed (Potamogeton pectinatus),



Comparison between 1949 and 1952 Stillwater Marsh acreages of plants that made up, by volume, 53% of the gizzard contents (excluding grit) of 145 ducks taken in the fall of 1949 and 1950. These three plants plus hardstem bulrush, for which there is but a slight decrease in acreage, are the main food plants of the marsh. Nothing has come in to replace this loss. This is in brief the Stillwater Marsh food situation just when:

- (1) duck populations are well above normal;
- (2) a mounting depredation problem is occurring on farmland of the surrounding area;
- (3) we need to draw ducks away from botulism infested Pelican Island which has food;
- (4) masses of coots, which are increasing in numbers each year, are beating the ducks to what food Stillwater has.



Reasons for change in acreage of various food plants between 1949 and 1952. Loss listed as dry is the result of drying up the Nutgrass Unit and Big Water for construction purposes. Too high water levels and plant succession are believed to be major factors causing other stands to die out.

alkali bulrush (Scirpus paludosus) and wigeongrass (Ruppia maritima). There is little change in a fourth primary food plant, hardstem bulrush (Scirpus americanus).

Probably the most serious loss is the decline of sago pondweed. Brood and nesting pair surveys enabled an evaluation of sago pondweed growth in many of the marsh ponds. Some ponds not covered by these surveys were covered in late August for the specific purpose of determining how much sago remained. Others close to roads were observed throughout the summer. The sago growth was compared to that of 1949 and 1950. During these years sago or wigeongrass formed an almost solid mat across all marsh ponds excepting the Stillwater Point Reservoir and the deeper and oldest most permanent lakes of the marsh such as Lead Lake and Millen's Channel. Today sago is almost completely gone where it was formerly present from the east side of the marsh through Foxtail and Goose Lake Units to "D" Dike. This involves over 1000 acres. Those ponds of the Tule, Lead, Millen, Swan and Willow Lake Units, which formerly had solid mats of sago, now have an average of from 10 to 70% of their acreage covered with sago. In some sago is now entirely absent. A rough estimate would place sago growth at 25% of their total open water acreage. An estimate of the percentage of open water containing sago mats was made on many marsh ponds. This is the basis of the acreages given on the histograms. Many ponds where the sago is almost gone are going to sparse coontail (Ceratophyllum demersum) growth like the Lead Lake type of habitat.

We have something different in the Pintail Bay Unit, which was dry last year. Pintail Bay itself is the principal body of water in this Unit. Its depth formerly ran from about a foot in the spring to dryness in August or September. A solid mat of wigeongrass formed across it. This year the depth of Pintail Bay ran from 20 inches at its ~~upper~~ end to 36 inches at its ~~lower~~ end. Sago pondweed appeared at the upper end and gradually extended its growth half-way <sup>lower</sup> up the lake before stopping. No wigeongrass has appeared. The upper, deeper, end of the lake remained barren. Pintail Bay appears to offer the most food of any one of our Units.

Everywhere that sago did appear, seed production was good. However, by the end of August, these seeds were practically all ripped off the plants as well as the leaves. All that remained of what sago we had were stems. It seems everywhere there was a substantial quantity of sago, there was also a mob of greedy coots. These prolific culprits are robbing the ducks of their main food item. It seems we are supposed to save these coots for the duck hunters, anyone of whom in this part of the country don't consider them worth the price of shotgun shells.

We would like to have an answer to our sago loss. It is suspicioned that this years deep water combined with the long period since de-watering are factors. Generally speaking, the sago that did



appear came up in water that was less than two feet deep. The sago decline started last year. This calls for two questions - Will de-watering and setting back the plant succession bring this sago back? Will we ever have sago growth at the deep levels proposed for the marsh units?

The loss of food from having the Nutgrass Unit and Big Water dry cannot be underestimated. Besides the prize sago and wigeongrass beds these two units had, there was also most of the alkali bulrush. To compensate in a small way for this big loss is a good growth of alkali bulrush in Pintail Bay, at the north end of the Northwest Pond and other northern ponds. Some of this growth is new.

The appearance of favorable plant growth in newly flooded areas was disappointing. Such was also the case in the low intermittently flooded alkali weed areas surrounding much of the west side of the marsh. We expected these areas to bring forth some sago. To all practical purposes, they brought forth none.

Growth in the first growing season for Dry Lake and the sand dune area below Pintail Bay was carefully watched. The shore of Dry Lake was seeded to alkali bulrush last year, but more seedling cattail appeared than bulrush. The growth of both was spotty. No submergent growth was observed here. New growth in the newly flooded sand dune area below Pintail Bay was much the same. It, too, came up with spotty patches of cattail and alkali bulrush with the former predominating. In shallow water some seedling sago, wigeongrass and horned pondweed also appeared. Stands of seedling cattail in addition to the above areas appeared off "D" Dike and at several locations in Pintail Bay. The surprising thing was that much of this cattail came from seed that germinated under water. Seedling cattail appeared in barrow pits that contained two feet of water during the growing season. The plants when young had long tape-like leaves which floated on the water before becoming erect.

At other locations cattail receded. At three locations in the Millen's Channel area the cattail zone, by actual measure, at designated spots, receded 11 to 17 feet. Along Foxtail and Goose Lakes around 40% of the cattail has failed to come up despite health-looking rootstocks.

Because of deep water, the saltgrass zone along our shores has worked upward, leaving a strip of open water between land and cattail that formerly existed on the edge. This has created new waterfowl habitat that will last until cattail invades it. Also, because of deep water, common spikerush (Eleocharis palustris) and dwarf spikerush (Eleocharis parvula) are practically absent this year.

Little has been said about cover here. Except in newly flooded areas, Stillwater has plenty of cover in water. On land the only cover is shrubs, notably burro-weed (Allenrolfea occidentalis), which grows to about three feet in height and is the main source of nesting cover for puddle ducks.

#### Pelican Island Marsh

When it comes to food, the reverse of what was said about Stillwater applies here. With water generally a foot or less in depth, this area, within the line of vegetation on our maps, at the mouth of the Carson River, came up with an abundance of food plants. Still these food plants produced a thin enough growth that a duck could set down anywhere. Livestock did not take it all as in the previous years when water was scarce. Food plants which appeared in great quantities include alkali bulrush, sago pondweed, knot grass (Paspalum distichum), horned pondweed and common spikerush. Appearing in lesser quantities were common three-square (Scirpus americanus), hardstem bulrush, water buttercup (Ranunculus aquatilis), and dwarf spikerush. Shorelines, which were flooded earlier in the spring, were covered with Juncus balticus and cocklebur (Xanthium sp.), which served as nesting cover.

#### Indian Lakes

There was practically no change in this area. The seep lakes produced good growths of sago and wigeongrass, but seed production was poor. The small stands of Potamogeton americanus in the other lakes remained the same.

### 3. Botulism

On July 9, the first evidence of botulism for the year was found at Pelican Island. Botulism in the area seemed inevitable for sometime previously, but it was not expected on such an early date. The outbreak apparently started about July 1. It continued from that date on with the rate of loss increasing through July and August. The problem areas appeared to be a peninsula running two miles north from the sand dune of Pelican Island itself and the north shore of Battleground Point running from the west end of the point east about three miles. The dead birds appeared along the above shorelines and out in the vegetation of the marsh itself in about equal numbers.

During this period the waters of this area gradually receded possibly as much as six inches. During this decline, however, there were minor fluctuations during which the waters rose for short periods. Presumably, these eruptions were from wind action and daily changes in evaporation, as inflow into the area was rather constant. The shorelines affected were moderately sloped and sandy. The possibility

that the birds were actually picking up the toxin out in the water should be considered.

From sample counts along the shorelines and out in the water, the number of dead birds was estimated. Up to the date of the last check during this period, (August 27), losses were estimated as follows:

|                               |            |
|-------------------------------|------------|
| Canada Goose                  | 3          |
| Mallard                       | 603        |
| Gadwall                       | 6          |
| Baldpate                      | 4          |
| Pintail                       | 3853       |
| Green-winged Teal             | 1275       |
| Cinnamon and Blue Winged Teal | 267        |
| Shoveller                     | 88         |
| Redhead                       | 15         |
| Ruddy Duck                    | <u>3</u>   |
| Total Ducks                   | 6114       |
| Coot                          | 16         |
| White-faced Glossy Ibis       | 19         |
| Killdeer                      | 40         |
| Black-bellied Plover          | 1          |
| Least Sandpiper               | 8          |
| Marbled Godwit                | 1          |
| Avocet                        | 235        |
| Black-necked Stilt            | 31         |
| Wilson's Phalarope            | 15         |
| California Gull               | 8          |
| Ring-billed Gull              | 16         |
| Forester's Tern               | <u>20</u>  |
| Total Shorebirds              | <u>394</u> |
| Total Waterfowl               | 6527       |

Additional data on this will be covered in our next report at the end of the outbreak.

#### 4. Lead Poisoning - None observed

#### B. Upland Game Birds

Aside from a covey of California quail in the Indian Lakes area, upland game bird use of the Area is sporadic where private land adjoins the Area.

### C. Big Game Animals

None observed.

### D. Fur Animals, Predators, Rodents and Other Mammals

#### 1. Fur Animals

This is the wrong time of the year to say much about muskrats. However, they appear to be doing well. House building began in August. It appears we will be able to open up all the marsh to trapping next fall, but won't have the trappers to do the job of trapping necessary. These animals have reached the point that along with the high water they have almost eliminated hardstem bulrush from some areas. They have opened up pockets in much of the cattail growth, but such pockets have no duck food and are simply masses of decaying organic matter.

#### 2. Predators

Several coyotes hung about the inlet to the Stillwater Point Reservoir during the period. Elsewhere little coyote activity was noted other than for a short period when the Nutgrass Unit became dry, causing some flightless ducks to become stranded. Coyote tracks in this area indicated they took advantage of this situation.

### E. Predaceous Birds

A prairie falcon was occasionally seen in the Stillwater Marsh area. One to several of these birds apparently worked the marsh over all summer. On one occasion one was found feeding on a hen teal on the Swan Lake Dike. This is the closest we can come to an avian predator problem.

### F. Fish

Thomas J. Trelease, Chief Fisheries Technician, Nevada Fish and Game Commission, spent a week during the early part of the period making an investigation of our bass fishery. Nothing, either verbally, or in the form of the promised report, has been received by our office on this investigation.

## III DEVELOPMENT AND MAINTENANCE

### A. Physical Development

Nutgrass Dike. Work was resumed on the Nutgrass Dike on June 10. The 2-1/2 yd. Lorain dragline was the only piece of earth

moving equipment assigned to the job. Because of the travel distance involved - 15 miles from the shop - two 10-hour shifts were worked each day. The double shift materially improved operations. Dragline work was completed on July 29. The 2-1/2 mile long dike contains some 49,693 cubic yards of fill material.

Except for a brief overflow from the Carson Sink last winter the Nutgrass Unit has been dry for a year. In spite of this long period of desiccation, all dragline work was on mats. For a distance of about one-quarter mile, on the lowest portion of the dike line, about 2 feet of soft mud overburden had to be cast aside in order to get to underlying clay for the dike fill.

Preliminary work is now in progress toward riprapping the dike with rock. A road has been built to a cobblestone deposit 8 miles from the dike and the softest (dustiest) portions of this road have been thinly surfaced with road gravel. This may seem like a lot of unnecessary work, but it had to be done. After only a few days of truck use, dust on the haul road became so deep that it was impassable to a car or pickup.

Future progress on the dike riprap will be accelerated when we receive the 1/2 yard Byers power shovel which is being transferred in. The actual loading of the riprap is a shovel job.

Lead Lake Canal. Excavation of this canal was postponed early in June when the Lorain dragline was transferred to the Nutgrass Dike. After the completion of the dike, the dragline moved back to the canal. At present it is excavating a 4000 foot section that was bypassed previously because of high water. This section is still under water, as much as 20 inches deep in places, but there is little possibility that the water will recede any farther. Completion of this section will finish the canal excavation, however, some bank fill will be required in another low flooded area where the cut was too shallow to provide sufficient dirt for the banks.

Nutgrass Road. This road has been built along the east side of the State Shooting Area. It extends between the Division Road and the east end of the Nutgrass Dike. The south end of the road, approximately 1.5 miles in length, was elevated and gravelled more than a year ago. The north end, 4 miles in length is now complete, except for surface material. Gravel is being used to cover the soft spots, since the north end forms part of the haul road for the Nutgrass Dike riprap, however, the gravel can only be considered temporary. This initial coat of gravel, since it is on new fill, will not survive the coming period of usage by trucks loaded with rock.

Navy Cabin Road. Fill on this road is now complete except for a 4000 foot gap in the section being built on the spoil of the Lead Lake Canal. Excavation of this canal section is now underway, but the entire strip is under water so that a delay of several months can

be expected before the spoil is dry enough to be used as road bed material. When finished the entire Navy Cabin Road will be 6.3 miles in length. About 2.7 miles of the east end has already been surfaced with gravel.

Structure No. 17. This is a 3-barrel, one-way structure located near the center of the Nutgrass Dike and designed to serve as the outlet to the Nutgrass Unit. Concrete work on the structure is complete. Bridging, backfilling and riprapping remain to be done.

East Pasture. Construction in this 440 acre pasture is now complete. The necessary dirt moving has been done and all concrete work is finished. At the present time preparations are underway for fall seeding of the new ground (232 acres) in the recently completed area. This new seeding will be limited to winter grain. Next spring sweet clover will be planted with the grain.

By way of summary the completed East Pasture has required the following construction work:

An irrigation canal (East Canal) 39,300 feet in length

Canal Checks - 2, concrete with three barrels

Lateral ditches - 6, with a combined length of 13,720 lineal feet

Lateral headgates - 6, constructed of steel culverts with concrete headwalls.

Lateral checks - 13, concrete, one-barrel

Irrigating turnouts - 43, constructed of concrete culvert with concrete base and headwalls

Contour dikes - 68,250 lineal feet

Haloxylon Control. On August 3 a patch of Haloxylon glomeratum was found approximately 1-1/2 miles east of the Management Area boundary on the lower slopes of the Stillwater Range. The Bureau of Land Management was notified and on August 4 a trip was made back to the area with John Crowl of that Agency. On August 8, 11 and 12, the Refuge Biologist, with a laborer on one of these dates, made a systematic search of the area, hoeing out the patches as they went. From the initial point, line transects at one-tenth mile intervals were run by jeep out to a point that patches were no longer found.

The patches, ranging from 11 to 460 plants each, covered over a square mile. In addition individual plants were found in an area 4 miles long by 1-1/2 miles wide. In all, at least 1400 plants were eradicated. Obviously, over such a wide area, many additional lone plants were overlooked. It appears that there may be individual haloxylon plants over much of the lower east foothills of the Stillwater Range, an area of many square miles. Much of this area cannot be covered by jeep.



We have reached the conclusion that halogeton is here to stay, and from the lone, scattered, plants that go to seed this year many more plants will appear next.

To date, only one halogeton plant has been found on the Management Area. Of course it was removed. Our control efforts off the Management Area boundary were aimed at preventing its spread to the Refuge.

Equipment. On July 26 we received a caterpillar D-6 angle-dozer from Ruby Lake Refuge. This dozer will be used for spreading rock riprap on the Nutgrass Dike.

Another item of equipment - in the process of construction - is an air-thrust boat. This has been one of the most interesting projects in some time, but it has certainly involved more work than one would expect for a small boat. The biggest job has involved locating all of the various attachments that go with an airplane motor. The boat hull is of quarter-inch marine plywood. As an afterthought we reinforced this with one layer of glass cloth and, we might add, are highly pleased with the results. If we could do the job over, we would forget the wood and make the entire hull from laminated glass cloth and plastic. This material weighs no more than aluminum yet has an impact strength about 6 times that of steel. An added advantage is that a glass and plastic hull can be formed about a mold in hours while it takes days to assemble a wood hull or rivet leak-proof seams in aluminum. Furthermore, by adding pigment to the plastic you get a permanent paint job which will eliminate a major maintenance expense. After making a comparison of costs we find that materials for a glass and plastic hull are no more expensive than other standard boat materials, while labor costs are far less. This is our first experience with the glass cloth and we are certainly enthusiastic about it.

The pictorial section of this report has illustrations of the boat in two different stages of construction. We hope that our next narrative will illustrate the boat in action.

Repair of Equipment. Tractor HD-14, 995: New track rails, repair of front idlers, and new discs in left side steering clutch.

GMC, 6x6 Truck, I-18315: A new short-block motor assembly was installed.

International 1-1/2 Ton Stake Truck, I-18562: A new short-block motor assembly installed.

Caterpillar R-5 Tractor: Repair to track housing and new body spring installed.

Caterpillar 22 Tractor: Final drive gears and bearings replaced.

On July 18, the International truck-trailer, I-18283, from Malheur Refuge broke down south of Ruby Lake Refuge. Driver, Noel Cagle, arrived in Fallon that night. After purchasing new crankshaft bearings he returned to the truck accompanied by Stillwater's Mechanic, Mamuel Olano. The new bearings were installed and the truck was started for Fallon. It was driven about halfway up toward Austin summit when the bearings started to go out again. After this second breakdown, a commercial transport was hired to tow the truck to our shop at Stillwater. A subsequent check revealed that the crankshaft was out-of-round and, furthermore, that all motor parts were so badly worn that a complete overhaul was necessary. The motor was removed and taken to Reno for rebuilding. The truck was turned over to Marselle Leake, from Malheur Refuge, on September 4.

## B. Plantings

### 1. Aquatic and Marsh Plants

Aside from a planting of hardstem bulrush below "D" Dike and the unsuccessful introduction of Paspalum distichum to the Stillwater Marsh, this year's plantings of marsh plants were restricted to the last period. However, it might be well to discuss the success of the plantings, which is something that could not be determined during the period the plantings took place.

The planting of 275 clumps of hardstem bulrush in Pintail Bay, Dry Lake and Foxtail Lake to provide edge where it is now absent, appears to be a failure. At the beginning of the growing season these clumps were wedged in the mud over which there was two to three feet of water. Culms did not appear from then until July and then only from one to about five at a planting site where an average of eight clumps had been placed. Wave action in most cases beat the culms down. It is doubtful that we will see much, if any, result from these plantings.

The planting of burro-weed to the bare Pintail Bay Dike for nesting cover also appears to be a failure. Most of these plants are dead. They were probably planted too high on the dike to receive sufficient moisture.

Last year's sowing of alkali bulrush seed to the shore of Dry Lake and the Dog Head Pond in Foxtail Lake was already mentioned. More cattail than bulrush appeared. Water levels at these two locations had to be held too high to obtain maximum germination of the planted seed.

In our last report, we mentioned the Sagittaria olneyi planting as being a failure. Muskrats neatly consumed the rootstocks of every clump planted except two. However, we now have to alter our statement as to the success of this planting. About one-fourth mile

from a planting of this plant made last year, there was found, in August, a strip of olneyi about 150 feet long and six feet wide. It is doubtful that this strip was here previous to the planting for two reasons. 1. No old growth was noted. 2. The closest known olneyi to Stillwater is over 100 miles away. Presumably this strip started from a rootstock carried from the original planting site by water or muskrat. It certainly has put on a phenomenal growth and has produced some seed.

In June two burlap sacks of Paspalum distichum stolens were taken from the Pelican Island Marsh to Stillwater and planted at a number of sites in the marsh and East Pasture. Apparently, none of it survived. The Stillwater Marsh was probably too alkaline and the water too intermittent in the East Pasture for survival.

In general, this was a poor year to make plantings because of water conditions. The hardstem bulrush plantings probably would have been successful had the water been lower. Because we could not predict the level water levels would reach, it was difficult to make successful plantings of shoreline species.

## 2. Trees and shrubs

There were no new plantings of trees and shrubs during this period. However, the trees that were set out during the last narrative report period on the west side of the Stillwater Service Yard did not survive.

## 3. Upland Herbaceous Plants - None

## 4. Cultivated Crops - None

## C. Collections

A male black-bellied plover, found about to die of botulism on August 27, was put up as a study skin. It will be sent to the National Museum.

## D. Receipts of Seed and Nursery Stock - None

# IV ECONOMIC USE OF REFUGE

## A. Grazing

Grazing conditions were the best in years because of the heavy runoff down the Carson River and high water at Stillwater. Much forage went unused, an unusual situation for this station.

With great quantities of alkali weed at the north end of the Stillwater Marsh, most of the alkali bulrush normally taken, went untouched. As already mentioned, the seed heads of a good portion of the alkali bulrush, *Paspalum* and other plants at Pelican Island were left for the ducks for the first time in years.

There was only one Special Use Permit issued during the period. That was to one of our "problem graziers" for a maximum of 40 AUM's. Robert W. Erb is the son of one of the ranchers whose ranch is adjacent to the Management Area who feel that they should not be charged for grazing which they have been able to utilize free of charge for the last thirty to forty years.

B. Haying - None

C. Fur Harvest - None

D. Timber Removal - None

## V FIELD INVESTIGATION AND RESEARCH

### A. Waterfowl Food Conditions

Considerable information of a research nature on this item was covered under the food and cover section.

## VI PUBLIC RELATIONS

### A. Public Uses

Visitor days of hunting, fishing and miscellaneous use will be tabulated on December 31st as per Mr. Krummes' memo of March 26, 1951.

### B. Refuge Visitors

The following visitors were received in Fallon during the report period:

May 2 - Frank Groves, Director, Nevada State Fish and Game Commission, spent the day on an inspection trip of Stillwater.

Hobart Brownell, Hollywood photographer, accompanied by Biologist, David Marshall, took pictures at Pelican Island.

- May 13 - Fred Evenden and Ralph Imbler, River Basins: marsh and waterfowl inspection.
- May 15 - Dr. Robertson, Range Specialist, and a student, from University of Nevada: conferred on pasture development.
- May 24 - James Ashley, PR Division, Regional Office, Nils Nilsson, State PR Coordinator, and Fred Wright, State Waterfowl Technician: inspection trip at Stillwater.
- May 26, 27 - Lee R. Jacoby of Regional Office: engineering advice.
- June 3 - John Ball of Washington Office: aerial and ground reconnaissance of Stillwater development.
- June 4 - Fred Evenden, River Basins: checked water conditions, Pelican Island and Stillwater Marsh.
- June 13 - Nils Nilsson, State PR Coordinator and Blanche Sullivan, PR Clerk: spent day on inspection trip of the Area.
- June 20 - Kenneth M. MacDonald, Regional Refuge Supervisor: refuge inspection.
- June 20, 21 - Howard Sargeant, Assistant Regional Refuge Supervisor: inspection of grazing areas and discussion of grazing and related problems.
- June 21 - Abbie Rowe, photographer from Office of Secretary of Interior: accompanied by David Marshall made tour of Area for photographs.
- July 2 - Kenneth M. MacDonald, Regional Refuge Supervisor: spent day in discussion of refuge problems.
- July 12 - Nils Nilsson, State PR Coordinator, and Fred Wright, State Waterfowl Technician: inspection of construction work at Stillwater and botulism at Pelican Island.
- July 15 - Frank Groves, Director, State Fish and Game Commission and Fred Wright: inspection of botulism problem at Pelican Island.
- July 16 - Richard G. Miller, Assistant Professor of Biology, Long Beach State College: made tour of marsh accompanied by Biologist, David Marshall.
- July 19 - Noel Cagle, Malheur Refuge: arrived in Fallon after breakdown of truck south of Ruby Lake Refuge.

- July 23 - Marselle Leake, Malheur Refuge: spent short time at Fallon in connection with disabled truck.
- July 25, 26 - Elmo See and Irving Larson, PR Auditors from Regional Office: audit of State and Service contributions.
- August 4 - John Crowl, Bureau of Land Management: accompanied by David Marshall, made survey of halogeton infested lands on east side of Management Area.
- August 8 - Nils Nilsson, State PR Coordinator: visit in A. M. for discussion of work program.
- August 15 - John Crowl, Range Conservationist, Bureau of Land Management: conference on halogeton.

#### C. Refuge Participation

- June 5 - The Refuge Manager attended an afternoon meeting of Churchill County Commissioners relative to proposed road and fence development at Stillwater.
- June 9 - The film "Behind the Flyways" was shown at meeting of Churchill Fish and Game, Unlimited. Approximately 60 persons attended.
- July 12 - Refuge Manager conducted a tour of Stillwater Area of approximately 20 veterans taking "On-the-job" farm training.
- July 16, 17 - Refuge Manager, accompanied by Refuge Mechanic, Manuel Olano, made a trip to Malheur Lake for inspection of air-thrust boat at that Refuge.
- August 22 - Biologist David Marshall, accompanied by Nils Nilsson, State PR Coordinator and Bill Wick, State Game Technician on inspection of chukar range in the Stillwater Mountains.
- August 26 - The Refuge Manager attended a public meeting in Reno relative to development proposals for the Truckee River.

#### D. Hunter Success

There was no hunting on the Area during the period.



### E. Fishing Success

With the coming of summer sport fishing usually tapers off. Neither catfish or bass seem to bite readily after the water becomes warm. There was some sporadic fishing during the period, but it was inconsequential. It was certainly nothing to compare with the heavy fishing use during the spring.

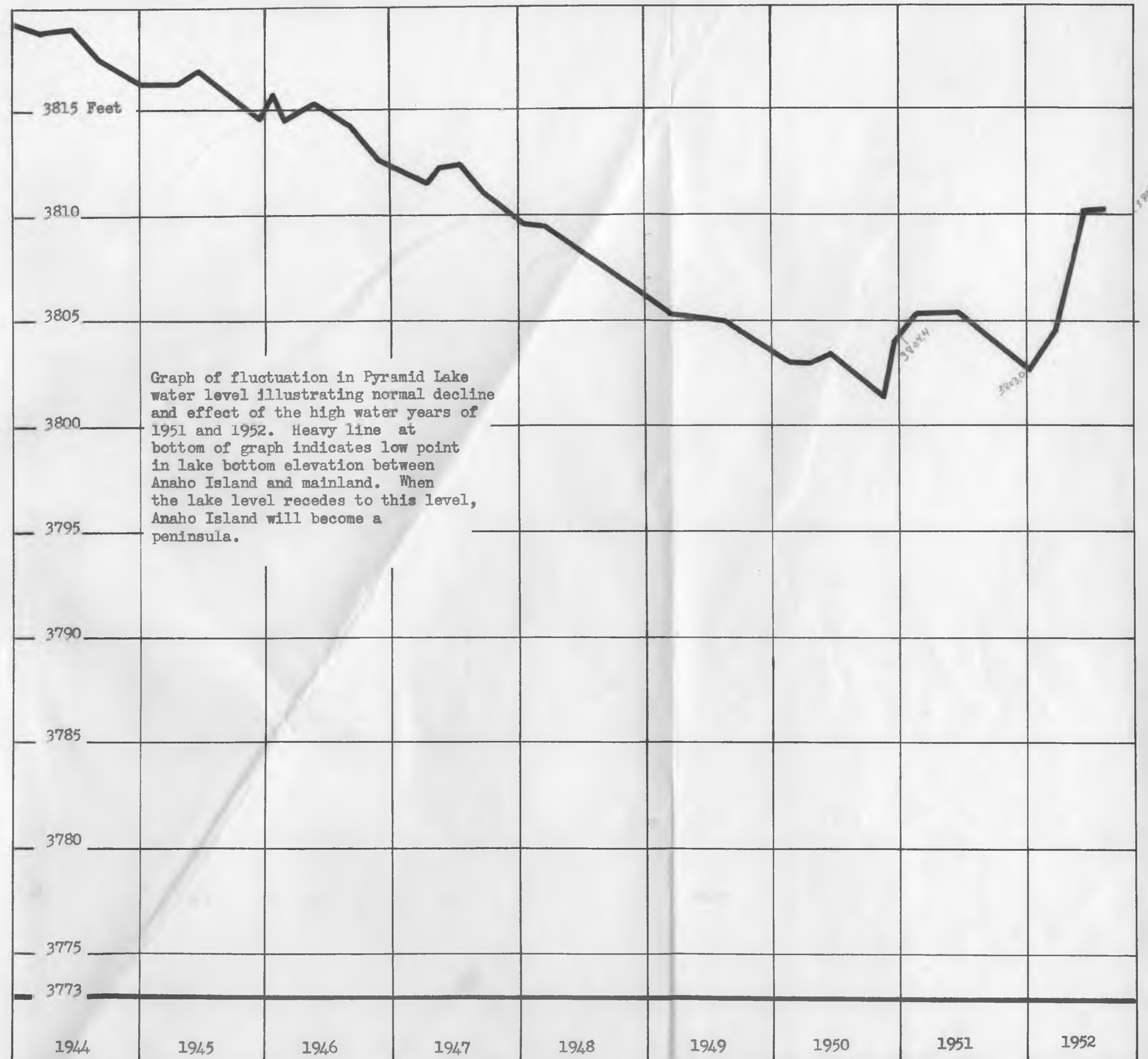
F. Violations - None

## VII OTHER ITEMS

At the end of the period the State construction crew, Pittman-Robertson employees on the cooperative development program, consisted of the following:

- 1 - Motor Patrol Operator
- 2 - Dragline Operators
- 1 - Rodman-Chairman
- 3 - Oilers
- 1 - Elevating Grader Operator
- 2 - Tractor Operators
- 1 - Concrete Crew Foreman
- 1 - Irrigator
- 1 - Laborer
- 5 - Truck Drivers

ANAHO ISLAND NATIONAL WILDLIFE REFUGE



## ANAHO ISLAND

Three trips were made to Anaho Island this period, on May 18, July 1 and July 23, respectively. The purpose of the trips was for routine inspections, to observe this year's nesting and to conduct several interested parties through the bird colonies. In addition, one trip was made on June 7, by boat, to the Needles or Pinnacles, at the north end of Pyramid Lake in cooperation with the State on a goose count. This afforded us the opportunity to view nesting colonies as well, there. Although these islands are not a part of the Anaho Island Refuge, it seems advisable to mention them for the record. In-so-far as can be determined, no one has investigated them for a number of years. We found only cormorants nesting on them and no gulls as at one time in the past. No attempt was made to count the nests, which undoubtedly number well over 1000.

### A. Weather Conditions

Similar to those described for Stillwater.

### B. Water Conditions

The accompanying graph shows how the water level of Pyramid Lake has taken a sudden turn upward because of the unpredicted runoff from the Sierras in the fall of 1950 and spring of this year. During these two periods, little water was diverted from the Truckee River, which feeds Pyramid Lake. Inasmuch as the Carson River flow was more than sufficient to fill Lahontan Reservoir, only enough water to run the power plant at Lahontan Dam was diverted from the Truckee. Its waters were therefore free to flow to Pyramid Lake much as nature intended from a snow pack that was around twice normal. This situation is indeed unusual. It will prolong, for several years, the eventual day that Anaho Island will become a peninsula.

### C. Fires - None

## II WILDLIFE

### A. Migratory Birds

From the three visits, we aren't qualified to determine peak populations and other data requested on NR forms. For this reason, these forms include only what was seen. The table shows this year's nesting as compared to last year's.

## COMPARISON OF NESTING DATA

|                                 | Nests | Young | Colonies |
|---------------------------------|-------|-------|----------|
| <u>White Pelican</u>            |       |       |          |
| 1950                            |       | 4160  | 15       |
| 1951                            | 5650  | 3742  | 11       |
| 1952                            | 5862  | 4053  | 15       |
| <u>Double-crested Cormorant</u> |       |       |          |
| 1950                            | 1028  | 1650  | 5        |
| 1951                            | 1300  |       | 4        |
| 1952                            | 710   |       | 6        |
| <u>California Gull</u>          |       |       |          |
| 1950                            |       | 400   | 1        |
| 1951                            | 1706  | 684   | 1        |
| 1952                            | 1500  | 1400  | 1        |

Information by species, or groups, follows:

White Pelican. The number of white pelicans using the area was about the same as in 1950, or slightly above last year. Yet there were no colonies present at the summit of the island as in 1950. Nesting was more advanced in the colonies at higher elevations while the reverse was true in 1950. In 1951 there was little correlation between nesting stages and elevation. On the May 18 trip a count of nests was possible in most of the colonies. Those that remained were not sufficiently advanced for a count at this time and were counted on July 1.

The count of young was made on July 1. Inventory techniques and dates of counts were like those made last year. Because only half or less of the adults are present at any one time, the nest count serves as the best indication of the size of the breeding population. Assuming two adults to a nest, this would place the nesting population for this year at nearly 12,000 adults!

Double-crested Cormorant. The cormorants didn't do so well this year. These birds nest right on the shoreline, a fact which caused the flooding out of many nests from rising water levels. Two new colonies were established; each contained less than 50 nests. One was in the gull colony and the other on the peninsula opposite the gull colony. Laying was not yet complete by May 18 and by the time of the following trip on July 1, most of the young had left their nests. The nest count was made on July 1,

Canada Goose. One dead young was found on the island. Around 100 moulting adults were present off-shore from the island.

California Gull. A nest count, made on May 18, showed about the same number of nests as last year. However, the high mortality of young that occurred in 1950 and 1951 did not exist this year. As usual, adult gulls worked over the pelican and cormorant colonies while we had the parents scared off. They ate eggs, disgorged fish and on several occasions were observed killing young pelicans for a few choice parts, after which the rest was left.

Caenian Tern. The tern colony in the gull colony is just barely hanging on. Eight young were counted on July 1.

Other Birds. Other birds seen on, or just off, the island includes western grebes, great blue herons, one raven with an egg in his bill, rock wrens, canon wrens, house finches, 18 American mergansers, a loggerhead shrike and one red-tailed hawk.

## 2. Food and Cover

On May 18 chub (Sinibatala phesus) was the dominant fish found disgorged by young pelicans. Along with the chubs were small quantities of carp and several Sacramento perch (Archoplites interruptus). By July 23 these birds were consuming almost 100% carp. Cormorant foods ran about the same.

## E. Predaceous Birds

None noted except the raven. The California gull, although not normally considered a predator, is the real predator here.

## VI PUBLIC RELATIONS

### Refuge Visitors and Participation

Accompanying us on the May 18 trip was J. R. Alcorn and son Albert. On the July 1 trip the following were present:

Mrs. Marion H. Beadle, Pasadena, California, Botanist,  
Lecturer on Mexico.  
Miss Barbara Beardslee, Compton, California, Student,  
Education Major, Long Beach State College.  
Dr. Richard G. Miller, Assistant Professor of Biology,  
Long Beach State College  
Maya Miller (Mrs. Richard G. Miller)  
Don Hatton, Fallon  
Laura E. Mills, Fallon School Teacher  
Margaret M. Wheat, Amateur Geologist and Archeologist,  
Fallon, Nevada



On July 28 the following took the trip to the island:

Mrs. Marion H. Beadle  
Dr. Richard G. Miller  
Laura E. Mills  
Mr. Gus Bundy, Photographer, Carson City, Nevada  
Mrs. Bundy

Colored slides of Stillwater and Anaho Island were enjoyed at the David Marshall home in Fallon by the following:

Dr. and Mrs. Richard G. Miller  
Mr. and Mrs. Vendell Wheat  
Refuge Manager and Mrs. LeRoy W. Giles  
Mr. and Mrs. Donnie, visitors from Bagdad, Iraq  
Miss Ruth Coleman, Fallon  
Miss Laura Mills  
Mrs. Marian H. Beadle, Pasadena, California

FALLON NATIONAL WILDLIFE REFUGE

## FALLON REFUGE

This refuge, at the outer edge of the Pelican Island Marsh, other than for several islands of an acre or less in size, was completely flooded this period.

Alkali bulrush is again actively growing on it. Probably no ducks or geese nested on it because of the absence of shoreline. However, a colony of Caspian terns was noted on one of the island. Coots and western grebes nested in the bulrush. Because the area was accessible only by airplane this period, only one observation of the refuge was made. This was on June 16 when the plane was in. On this date the above mentioned observations were made. Also seen were flocks of redheads totalling 1500 in number. Because of the limited observations, it does not seem advisable to submit NR forms.

Botulism hit this refuge along with the rest of Pelican Island. Information on this is in the Stillwater report. Additional information will be in the next report.

WINNEMUCCA NATIONAL WILDLIFE REFUGE

## WINNEMICCA LAKE REFUGE

There were not any trips made to this refuge during the report period.

This report was prepared by LeRoy W. Giles, Refuge Manager and David B. Marshall, Biologist.

Photography credit is given to Mr. Marshall for the pictures included herein.

The following NR forms are not applicable to the Area through this report period:

- NR 3 - Big Game
- 4 - Small Mammals
- 5 - Disease
- 6 - Fish
- 7 - Plantings
- 8 - Cultivated Crops
- 9 - Collections and Receipts
- 10 - Haying and Grazing
- 11 - Timber Removal

Submitted October 7, 1952

*LeRoy W. Giles*

LeRoy W. Giles  
Refuge Manager

APPROVED:

\_\_\_\_\_  
\_\_\_\_\_



REFUGE Stillwater NM Area

## W A T E R F O W L

MONTHS OF

to August, 19 52

| (1)<br>Species  | (2)<br>First Migrants Seen |      | (3)<br>Peak Concentration  |   | (4)<br>Last Migrants Seen |      | (5)<br>Young Produced                                  |   | (6)<br>Total <u>Use 1</u>  |
|---|----------------------------|------|--|---|---------------------------|------|--|---|--|
| Common Name   | Number                     | Date | Number   | Date  | Number                    | Date | Broods<br>Seen   | Estimated<br>Total  | <del>Estimated</del>   |
| 1. <u>Swans:</u><br>Whistling swan  |                            |      |  |   |                           |      |  |   |  |
| 2. <u>Geese:</u><br>Canada goose<br>Cackling goose<br>Brant<br>White-fronted goose<br>Snow goose<br>Blue goose  |                            |      | 500  | 8/6   |                           |      | 7  | 75  | 32,246   |
| 3. <u>Ducks:</u><br>Mallard<br>Black Duck<br>Gadwall<br>Baldpate<br>Pintail<br>Green-winged teal<br>Blue-winged teal<br>Cinnamon teal<br>Shoveller<br>Wood duck<br>Redhead<br>Ring-necked duck<br>Canvas-back<br>Scaup<br>Golden-eye<br>Buffle-head<br>Ruddy duck |                            |      | 4,800<br>1,600<br>100<br>15,800<br>3,200<br>20<br>3,000<br>2,000<br>4,800<br>4<br>10<br>2<br>500<br>29,000 | 8/20<br>8/20<br>7/11<br>8/6<br>8/20<br>5/29<br>5/29<br>8/20<br>7/14<br>5/15<br>5/1<br>5/1<br>6/30<br>8/20 |                           |      | 45<br>81<br>10<br>3<br>61<br>118<br>10<br>2<br>4<br>81 | 2,543<br>2,608<br>108<br>220<br>4,113<br>3,388<br>18<br>45<br>3,388<br>128<br>140<br>171<br>2,306 | 246,998<br>193,415<br>8,125<br>396,299<br>80,059<br>978<br>256,455<br>33,342<br>381,390<br>128<br>140<br>28<br>38,624<br>1,043,839 |
| 4. <u>Coot:</u><br>3-1750<br>(June 1949)  |                            |      |  |   |                           |      |  |   |  |

Form NR-1

(over)

# SUMMARIES

## Total Production:

Geese 75

Ducks 13,214

Coots 2,306

Total waterfowl <sup>use days</sup> ~~2,000~~ during period 2,712,066

Peak waterfowl numbers \_\_\_\_\_

Areas used by concentrations Pelican Island Marsh

Principal nesting areas this season \_\_\_\_\_

Stillwater Marsh

Reported by David B. Marshall

## INSTRUCTIONS

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.
- (2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.
- (3) Peak Concentration: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.
- (5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

3-1751

Form NR-1A

(Nov. 1945)

MIGRATORY BIRDS  
(other than waterfowl)Refuge Stillwater N. M. AreaMonths of May to August 1942

| (1)<br>Species                   | (2)<br>First Seen |      | (3)<br>Peak Numbers |           | (4)<br>Last Seen |      | (5)<br>Production  |                  |                | (6)<br>Total        |
|----------------------------------|-------------------|------|---------------------|-----------|------------------|------|--------------------|------------------|----------------|---------------------|
| Common Name                      | Number            | Date | Number              | Date      | Number           | Date | Number<br>Colonies | Total #<br>Nests | Total<br>Young | Estimated<br>Number |
| I. Water and Marsh Birds:        |                   |      |                     |           |                  |      |                    |                  |                |                     |
| Hared Grebe                      |                   |      | 100                 | August    |                  |      | 1                  | 5                | 10             | 100                 |
| Western Grebe                    |                   |      | 500                 | August    |                  |      |                    | 130              | 200            | 500                 |
| Pied-billed Grebe                |                   |      | 400                 | August    |                  |      |                    | 100              | ?              | 400                 |
| White Pelican                    |                   |      | 2000                | August 28 |                  |      |                    |                  |                | 5000                |
| Double-crested Cormorant         |                   |      | 10                  | August    |                  |      |                    |                  |                | 50                  |
| Great Blue Heron                 |                   |      | 6000                | August    |                  |      | 2                  | 1500             | 4000           | 10,000              |
| American Egret                   |                   |      | 30                  | August    |                  |      | 1                  | 5                | 25             | 30                  |
| Snowy Egret                      |                   |      | 3000                | August    |                  |      | 3                  | 700              | 2100           | 3500                |
| Black-crowned Night Heron        |                   |      | 2000                | August    |                  |      | 2                  | 550              | 1200           | 2000                |
| American Bittern                 |                   |      | 100                 | August    |                  |      |                    | Unknown          |                | 100                 |
| Least Bittern                    | 1                 | 6/4  | 1                   |           | 1                | 8/26 |                    |                  |                | 1                   |
| White-faced Glossy Ibis          |                   |      | 600                 | August    |                  |      | 4                  | 75               | 200            | 1000                |
| Virginia Rail                    |                   |      | 100                 | August    |                  |      |                    | Unknown          |                | 100                 |
| Sora                             |                   |      | 300                 | August    |                  |      |                    | Unknown          |                | 300                 |
| II. Shorebirds, Gulls and Terns: |                   |      |                     |           |                  |      |                    |                  |                |                     |
| Snowy Plover                     |                   |      | 50                  | August    |                  |      |                    | 10               |                | 50                  |
| Killdeer                         |                   |      | 600                 | June      |                  |      |                    | 250              |                | 1200                |
| Black-bellied Plover             | 1                 | 8/27 | 1                   | 8/27      | 1                | 8/27 |                    |                  |                | 20                  |
| Long-billed Curlew               | 1                 | 6/18 | 4                   | June      | 1                | 8/26 |                    | 2                |                | 4                   |
| Spotted Sandpiper                | 1                 | 5/22 |                     |           | 1                | 8/20 |                    |                  |                | 4                   |
| Willet                           | 1                 | 8/13 | 1                   |           |                  | 8/27 |                    |                  |                | 1                   |
| Greater Yellow-legs              | 1                 | 8/6  | 10                  | 8/20      |                  |      |                    |                  |                | 50                  |
| Peeps (Least & W. Sandpipers)    |                   |      | 3000                | August    |                  |      |                    |                  |                | 10,000              |
| Dowitcher                        | 3000              | 7/25 | 5000                | 8/20      |                  |      |                    |                  |                | 7000                |
| Marbled Godwit                   | 30                | 7/9  | 100                 | August    |                  |      |                    |                  |                | 100                 |
| Avocet                           |                   |      | 8000                | July      |                  |      |                    | 3350             |                | 8000                |
| Black-necked Stilt               |                   |      | 500                 | July      |                  |      |                    | 160              |                | 500                 |
| Wilson's Phalarope               |                   |      | 3000                | August    |                  |      |                    |                  |                | 100                 |

(over)

| (1)   | (2)        | (3)  | (4)                               | (5)   | (6)                                    |
|---|------------|--|-----------------------------------|---|--|
| III. <u>Doves and Pigeons:</u><br>Mourning dove<br>White-winged dove  |            | 20<br>August   |                                   |   | 20                                     |
| IV. <u>Predaceous Birds:</u><br>Golden eagle<br>Duck hawk<br>Horned owl<br>Magpie<br>Raven<br>Crow<br>Prairie Falcon                              | 1<br>5/1   | 1<br>5/1<br>10<br>August<br>50<br>August<br>4<br>June  | 1<br>5/1<br><br><br><br>1<br>6/27 |   |  |
| II <u>Shorebirds, etc. (Cont'd)</u><br>Northern Phalarope<br>California Gull<br>Ring-billed Gull<br>Forester's Tern<br>Caspian Tern<br>Black Tern | 20<br>8/20 | 100<br>8/30<br>400<br>July<br>200<br>August<br>500<br>August<br>200<br>August<br>300<br>July |                                   | 1<br>100<br>100<br>400<br>500<br>200<br>300 | 100<br>400<br>400<br>500<br>200<br>300 |
| Reported by   |            |  |                                   | David B. Marshall                           |  |

#### INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)  
II. Shorebirds, Gulls and Terns (Charadriiformes)  
III. Doves and Pigeons (Columbiformes)  
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1752  
Form NR-2  
(April 1946)

# UPLAND GAME BIRDS

1613

Refuge Stillwater V. W. Area

Months of May 1 to August 31, 1942

| (1)<br>Species   | (2)<br>Density   |                      | (3)<br>Young<br>Produced     |                    | (4)<br>Sex<br>Ratio | (5)<br>Removals |                     |                 | (6)<br>Total                           | (7)<br>Remarks   |
|------------------|--|----------------------|------------------------------|--------------------|---------------------|-----------------|---------------------|-----------------|--|--|
| Common Name      | Cover types, total<br>acreage of habitat               | Acres<br>per<br>Bird | Number<br>broods<br>obs'v'd. | Estimated<br>Total | Percentage          | Hunting         | For Re-<br>stocking | For<br>Research | Estimated<br>number<br>using<br>Refuge | Pertinent information not<br>specifically requested.<br>List introductions here.                 |
| California Quail | <u>Sarcophagus and</u><br><u>Atriplex</u><br>200 acres |                      | 1                            | 8                  | ?                   | 0               | 0                   | 0               | 100                                    | One covey in Indian Lakes.<br>Intermittent use of Area by<br>others adjacent to private<br>land. |

## INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.\*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

\* Only columns applicable to the period covered should be used.



3-1570  
NR-8a

REFUGE GRAIN REPORT

Refuge Stillwater N. D. Area

Months of July thru August 1952

| (1)<br>VARIETY | (2)<br>ON HAND<br>BEGINNING<br>OF PERIOD | (3)<br>RECEIVED<br>DURING<br>PERIOD | (4)<br>TOTAL | (5)<br>GRAIN DISPOSED OF |          |           |           | (6)<br>ON HAND<br>END OF<br>PERIOD | (7)<br>PROPOSED USE |      |          |
|----------------|--|-------------------------------------|--------------|--------------------------|----------|-----------|-----------|------------------------------------|---------------------|------|----------|
|                |  |                                     |              | TRANS-<br>FERRED         | SEEDED   | FED       | TOTAL     |                                    | SEED                | FEED | SURP.    |
| <b>Barley</b>  | <b>383</b>                               | <b>0</b>                            | <b>383</b>   |                          |          | <b>90</b> | <b>90</b> | <b>293</b>                         | <b>293</b>          |      | <b>0</b> |
| <b>Rye</b>     | <b>2</b>                                 | <b>0</b>                            | <b>2</b>     |                          | <b>2</b> |           | <b>2</b>  | <b>0</b>                           | <b>0</b>            |      | <b>0</b> |

(8) Indicate shipping or collection points.....

(9) Grain is stored at.....**Headquarters Yard, Stillwater Refuge**

(10) Remarks.....

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lbs., Corn (ear)—70 lbs., Wheat—60 lbs., Barley—50 lbs., Rye—55 lbs., Oats—30 lbs., Soy Beans—60 lbs., Millet—50 lbs., Cowpeas—60 lbs., and Mixed—50 lbs. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately: Corn, wheat, proso millet, etc. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share-cropping, or harvest from food patches.
- (4) A total of Columns 2 and 3.
- (6) Column 4 less Column 5.
- (7) This is a proposed breakdown by varieties of grain listed in Column 6.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters grainary", etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

REFUGE Ancho I island Refuge

## W A T E R F O W L

MONTHS OF

Visit of July 1, 1952

to

19

| (1)<br>Species<br><br>Common Name   | (2)<br>First Migrants Seen |      | (3)<br>Peak Concentration |      | (4)<br>Last Migrants Seen |      | (5)<br>Young Produced |                    | (6)<br>Total            |
|---|----------------------------|------|---------------------------|------|---------------------------|------|-----------------------|--------------------|-------------------------|
|   | Number                     | Date | Number                    | Date | Number                    | Date | Broods<br>Seen        | Estimated<br>Total | Estimated<br>for Period |
| 1. <u>Swans:</u><br>Whistling swan  |                            |      |                           |      |                           |      |                       |                    |                         |
| 2. <u>Geese:</u><br>Canada goose<br>Cackling goose<br>Brant<br>White-fronted goose<br>Snow goose<br>Blue goose  |                            |      | 100                       | 7/1  |                           |      |                       |                    |                         |
| 3. <u>Ducks:</u><br>Mallard<br>Black Duck<br>Gadwall<br>Baldpate<br>Pintail<br>Green-winged teal<br>Blue-winged teal<br>Cinnamon teal<br>Shoveller<br>Wood duck<br>Redhead<br>Ring-necked duck<br>Canvas-back<br>Scaup<br>Golden-eye<br>Buffle-head<br>Ruddy duck |                            |      |                           |      |                           |      |                       |                    |                         |
| 4. <u>Coot:</u>   |                            |      |                           |      |                           |      |                       |                    |                         |

3-1750  
(June 1949)

(over)

Form NR-1

## SUMMARIES

### Total Production:

Geese\_\_\_\_\_

Ducks\_\_\_\_\_

Coots\_\_\_\_\_

Total waterfowl usage during period\_\_\_\_\_

Peak waterfowl numbers\_\_\_\_\_

Areas used by concentrations\_\_\_\_\_

Principal nesting areas this season\_\_\_\_\_

Reported by David B. Marshall

## INSTRUCTIONS

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.
- (2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.
- (3) Peak Concentration: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.
- (5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

3-1751  
Form NR-1A  
(Nov. 1945)

MIGRATORY BIRDS  
(other than waterfowl)

Visit of May 18, 1952

Refuge Anaho Island Refuge

Months of \_\_\_\_\_ to \_\_\_\_\_ 194\_\_\_\_\_

| (1)<br>Species                          | (2)<br>First Seen |      | (3)<br>Peak Numbers |      | (4)<br>Last Seen |      | (5)<br>Production  |                  |                | (6)<br>Total        |
|---|-------------------|------|---------------------|------|------------------|------|--------------------|------------------|----------------|---------------------|
| Common Name                             | Number            | Date | Number              | Date | Number           | Date | Number<br>Colonies | Total #<br>Nests | Total<br>Young | Estimated<br>Number |
| I. <u>Water and Marsh Birds:</u>        |                   |      |                     |      |                  |      |                    |                  |                |                     |
| Western Grebe                           | 1                 | 5/18 |                     |      | 1                | 5/18 |                    |                  |                |                     |
| White Pelican                           |                   |      |                     |      |                  |      | 15                 | 5,862            | 4,053          | 17,000              |
| Double-crested Cormorant                |                   |      |                     |      |                  |      | 6                  | 710              |                | 5,000               |
| Great Blue Heron                        |                   |      |                     |      |                  |      | 1                  | 15               | 40             | 60                  |
|   |                   |      |                     |      |                  |      |                    |                  |                |                     |
| II. <u>Shorebirds, Gulls and Terns:</u> |                   |      |                     |      |                  |      |                    |                  |                |                     |
| California Gull                         |                   |      |                     |      |                  |      | 1                  | 150              | 1,400          | 4,500               |
| Caspian Tern                            |                   |      |                     |      |                  |      | 1                  | 6                | 8              | 25                  |

(over)

| (1)   | (2)      | (3)         | (4)      | (5)         | (6) |
|---|----------|-------------|----------|-------------|-----|
| <b>III. <u>Doves and Pigeons:</u></b><br>Mourning dove<br>White-winged dove                               |          |             |          |             |     |
| <b>IV. <u>Predaceous Birds:</u></b><br>Golden eagle<br>Duck hawk<br>Horned owl<br>Magpie<br>Raven<br>Crow | <b>1</b> | <b>5/18</b> | <b>1</b> | <b>5/18</b> |     |
| Reported by <u>David B. Marshall</u>  |          |             |          |             |     |

#### INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)  
II. Shorebirds, Gulls and Terns (Charadriiformes)  
III. Doves and Pigeons (Columbiformes)  
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.





M-370. Flooded saltgrass zone bordered by cattail. Normally, this zone is dry, but its flooded status this year more than doubled the amount of shoreline in the Stillwater Marsh and made up territorial habitat for approximately 45% of the nesting ducks.  
8/18/52



M-375. Shoreline in Goose Lake Unit, as it looks this year. Water levels were raised so that the cattail zone is considerable distance away from shore. Note the dead cattail (last year's growth) adjoining seemingly healthy cattail. This unit has been flooded for a few years only so little saltgrass has started.  
8/26/52



M-390. Growth of cattail and alkali bulrush which came up at the shallow north end of Dry Lake. 8/29/52



M-389. Shoreline of Dry Lake, flooded last fall and planted to alkali bulrush, remained bare in some spots and in others produced seedling growths of alkali bulrush and cattail. Needless to say - the cattail predominates. 8/29/52



M-322. The heavy runoff down the Carson River made conditions ideal for both livestock and ducks at Pelican Island. This meadow-type contains water buttercup, horned and sago pondweeds, spikerush, wire rush, saltgrass and Festuca distachya. 6/18/52



M-341. Areas at Pelican Island such as this which are normally little more than alkali flats became nesting duck and livestock areas because of the record runoff. The lower parts of this view were covered with about 3 feet of water which at the end of dumping drained off leaving duck ponds with heavy aquatic growth. 7/4/52



M-303. Aerial view of a portion of the flooded sand dune area below Pintail Bay. This has been our marsh outlet to the Carson Sink. In the background below the Stillwater Range is the Big Water, former marsh outlet. 6/16/52



M-386. With its first water during the growing season, sparse growths of cattail, saltgrass and alkali bulrush appeared in the sand dune area below Pintail Bay. Cattail in background is from seed that germinated under water 8/28/52



M-379. West end of Millen's Channel. Typha angustifolia on the left and T. domingensis on the right. Water is about five feet deep here. Boat is refuge constructed pirogue. 8/26/52



M-381. Typha domingensis in the Marrows Channel. 8/26/52



M-380. View in Willen's Channel. 8/26/52



2-337. Our allele bulrush (Scirpus paludorum) always produces big, full, seed heads. 7/8/52

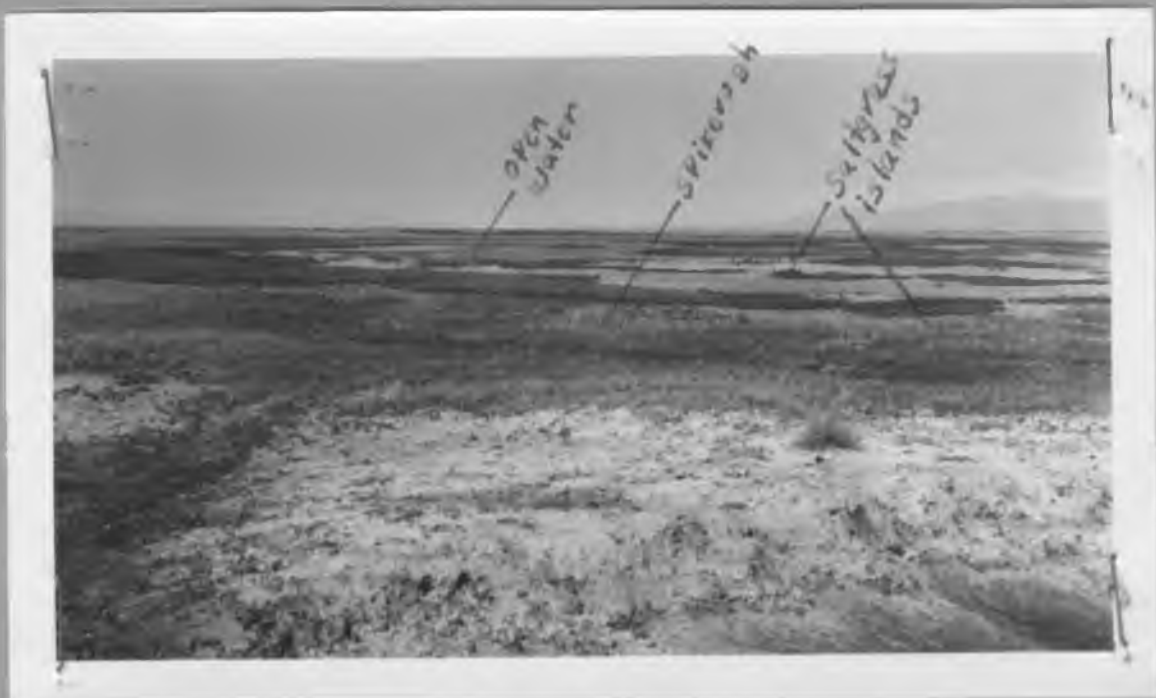




M-19., 6/29/49 (above) and M-373., 8/18/52 (below). Two views of the Northwest Pond taken at the same location, one three years previous to the other. This shows vegetative changes that have taken place since 1949 as the result of high water. The saltgrass zone in the 1949 view was dry, contained some foxtail barley (*Hordeum jubatum*) and *Juncus balticus* in with the saltgrass and extended to the hardstem bulrush at the center left. Since 1949 the saltgrass has receded back from the hardstem, the *Juncus* has mostly disappeared, the foxtail has completely disappeared, but the hardstem bulrush out in the open water shows no change.



M-261. (Above) 3/5/52 and M-327. (Below) 6/27/52. Two identical views taken from a muskrat house in the Goose Lake Unit. Top view is winter view of 1951 cattail growth. Bottom, 1952 growth in old 1951 growth. This shows how the edges of the cattail islands failed to come up in 1952. The old growth in the bottom view is little more than a mat with new growth appearing only at the center of the islands.



U-193. (Above) 5/16/51 and U-377 (Below) 8/26/52. Two views looking north from the fill leading to the West Boat Landing. Here about a foot higher water in 1952 has flooded additional area. Alkali weed has appeared on the barrow pit bank. The saltgrass islands in the 1951 photo are largely under water in 1952. The spikerush and saltgrass on the former islands have given way to Juncus. The open water in the background has given way to almost solid cattail.



M-28 (above) 8/8/49 and M-368 (below) 8/15/52. Two photos taken from almost the same place on Navy Cabin Hill showing additional vegetational changes over a span of three years. Water in the 1949 view was probably around two feet lower than in 1952. Foreground has been torn out by equipment. Aside from this, changes can be attributed to high water and muskrats. The high water has covered up most of the islands in the 1949 view. The saltgrass zone has receded shoreward. The hardstem bulrush island in the center of the 1949 photo is practically indistinguishable in the 1952 photo, but its location is shown by a duck blind with a muskrat house atop it which was hidden in the 1949 photo. A hardstem bulrush clump at the left center edge of the 1952 photo is out of the 1949 photo.



M-306. Aerial view of the northwest corner of the Stillwater Marsh. This is one of our best ponds. Hardstem bulrush clumps make for good cover and open water interspersed. Carson Sink, flooded, in background. 6/16/52



M-291. Stand of hardstem bulrush at south end of Pintail Bay. 5/23/52



M-363. Halocroton as it appeared in patches in dead shadscale  
(Atriplex confertifolia) growth in Stillwater Range  
foothills. 8/11/52



M-365. Halocroton plant previous to flowering. 8/11/52





M-284. Shoreline at Pelican Island of the type that produced botulism.  
Note the dead birds. 8/27/52



M-286. Bass fishermen at West Boat Landing at 6:00 p.m. on a weekday  
evening. 4/30/52





White sweet clover in East Pasture. The man is NOT sitting down.  
6/10/52



M-343. Structure No. 17 under construction in foreground. Lorain  
dragline working on Nutgrass Dike in background. 7/16/52



13-344. Lloyd L. Danberg, oiler, chipping out caked mud from 2-1/2 yd. bucket on Lorain dragline used on Nutgrass Dike construction. 7/16/52



W-355 and W-356. Pouring of sidewalls on Structure No. 17, showing concrete bucket on Loran being filled at the concrete mixer, to the left. Structure on right. 8/1/52



M-359. Air-thrust boat hull prior to decking. 8/2/52



M-388. Air-thrust boat with hull practically complete and motor in place for installation. 8/29/52

Succeeding photos taken at Pyramid Lake  
and Anaho Island Refuge



M-350. Hot spring which gushes out from the north side of the Pyramid, a huge rock island off the east shore of Pyramid Lake near Anaho Island. 7/23/52



M-335. This sign, placed well up on the shore of Anaho Island in 1950, illustrates Pyramid Lake water conditions. 7/1/52



M-396. California gulls in Anaho Island cormorant colony. They jump at the opportunity to seize eggs and disgorged fish when parent cormorants are scared away by human intrusion. Many cormorant nests on the side of the island were destroyed by high water. 7/1/52



M-328. "Frying size" young white pelicans. 7/1/52





M-331. Anaho Island pelican pod as seen from a high point on the island. Extent of a nesting site is illustrated by the absence of downy brome grass (Bromus tectorum) present elsewhere on the island. Consequently, colony sites, aside from shrubs, have a bare look. 7/1/52



M-348. Same of the same pod shown above. 7/1/52



M-349. This one was kind enough to linger behind the rest of his flock for a portrait. Pelicans at this stage will soon be flying. 7/1/52



M-333. A portion of Sancho Island taken from the summit of the island showing site of pelican colonies. 7/1/52



M-294 and 14-296. Cormorant colonies on some of the Pinnacles, or  
Needles, islands at the north end of Pyramid Lake.  
6/7/52



3-292. The largest of the Pinnacles group that is still surrounded by water. 6/7/52